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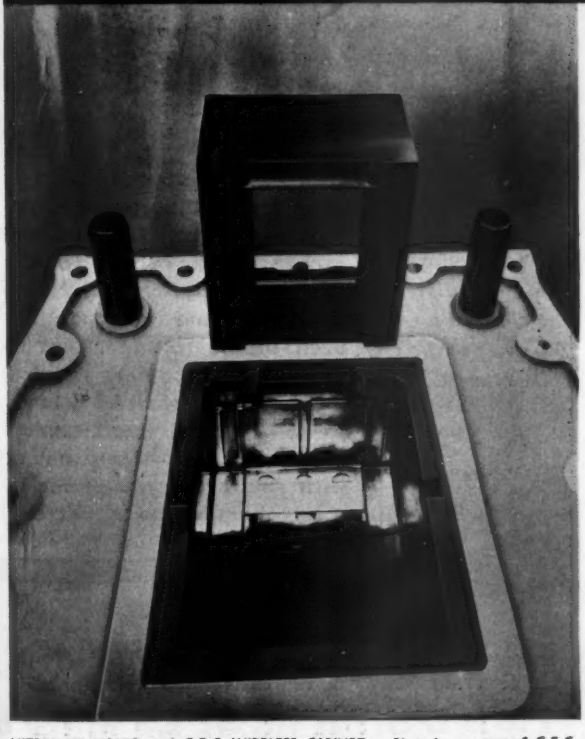

NITRALLOY MOULD and G.E.C. WIRELESS CABINET. Photo by courtesy of G.E.C. Witton Moulded Insulation Works, Birmingham.

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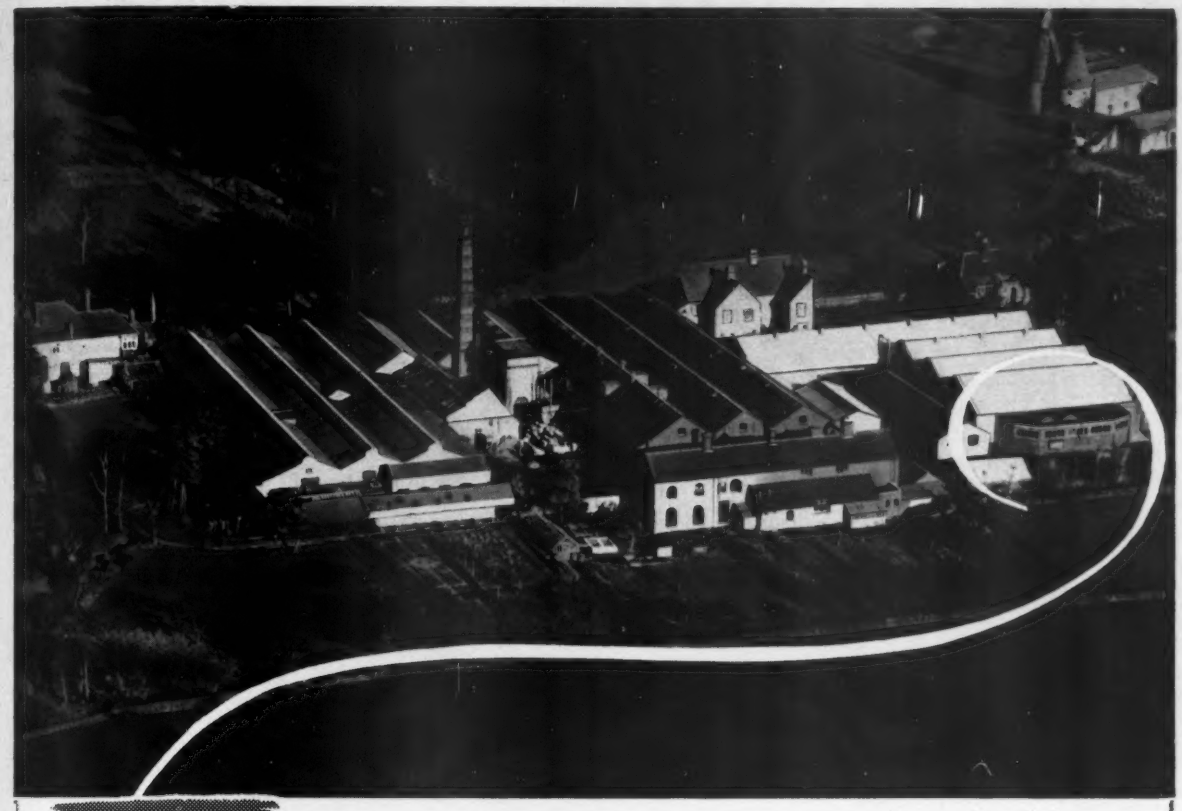

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. III. APRIL, 1939 No. 23

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Vol. III. No. 23 APRIL, 1939

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

CAST RESINS FOR THE ARTIST

ON another page in this issue we publish some notes specially directed to those who, in their work, are not interested in those plastics that need heavy or costly machinery in their fabrication; indeed, they wish to work, in the main, with simple plaster moulds, if possible, and the ordinary lathe. The article in question gives them some hope of working in the beautiful plastics that are now available.

Foremost among such workers are artists, especially sculptors, and the photograph we published last month of Mr. Mancuso's production of 12 huge statues for the New York Fair has aroused great interest. We have also been inundated with requests for more information. It is to be hoped that those manufacturers in this country who make liquid synthetic resins for casting, and there are several of them, will co-operate in what appears to be an important outlet.

So far this country appears to be behind in the production of cast-resin figures, although the cast phenolics are now very widely used for other purposes. But we have not yet seen a statuette cast by a British artist. Indeed, the only example we have seen in this country was on Mr. Luster's desk in the offices of Catalin, Ltd., and that example was, of course, made in America. In fact, we presume that the United States is the only country where such work is being carried out methodically and continually.

However, to return to the actual mould and moulding process. We stated in our last issue that Mr. Mancuso had used a rubber mould. The current number of *Modern Plastics* gives some further information regarding the production of this simple type by the non-technician. Obviously skill in manipulation and a knowledge of materials must be acquired.

The present methods may be said to be due to the fact that rubber latex has become a commercial proposition within the past few years. Rubber latex is the milk-like fluid that is exuded from the rubber tree and is an emulsion of water and rubber. When this is treated with acetic acid, rubber floats to the top, leaving water behind, is skimmed off and is converted into the well-known sheet. It is well-known, however, that if the hand is dipped in the latex and then removed a similar action takes place and a "rubber glove" can be peeled off. This suggested the use of latex for modern rubber glove making and, indeed, other uses of latex, e.g., for spraying.

Latex, therefore, is used for the making of the moulds in question, the liquid being pretreated with the usual ingredients for vulcanizing. The resultant cream can be applied by dipping, spraying or brushing methods. The dipping process is best suited where a small object is desired to be coated with a relatively thin coating of rubber. Thus the original model, from which copies of castings are desired, is dipped into the cream and withdrawn slowly. The model is then placed in a warm room to dry, when the water separates and the figure is covered with a translucent film. Obviously, on a large scale proper drying ovens or rooms, maintained at about 170 degrees F., are required. The model may be re-treated to obtain a second or even third film, since one coating is only about one-hundredth of an inch thick. When the required thickness is obtained the rubber is stripped off the model and is ready to receive the liquid resin.

In the case of large objects and sometimes with even small ones, it would be necessary to support the rubber mould during the curing of the resin for obvious reasons of distortion. An outer hard shell of solid plaster of Paris can be built round the rubber and removed when the casting has hardened. After this curing has been carried out the plaster is separated, the rubber mould is stripped off like a glove, leaving the finished resin object exposed. It is reported that, owing to the ability of the liquid latex to penetrate the smallest crevices, extremely faithful reproductions are possible. Human hands have been reproduced with the finger-prints sharply defined.

The rubber mould can be re-used at least 40 or 50 times with care, so that the mould cost becomes almost negligible. If the original model itself is of plaster of Paris, the production of the rubber mould is more rapid and simpler. The plaster absorbs the water very rapidly and a thicker film is built up in one dipping.

The actual casting of the liquid resin into the rubber mould, and its control during solidification, need special care. Since the mould is of rubber, a temperature of 200 degrees F. should not be exceeded.

Leipzig Fair

AMIDST the alarums and excursions that have and are still taking place in Europe, it is as well now and then to rest one's mind or to divert one's attention to the more peaceful occupations that take place just as normally as ever they did, evan though they are rendered almost invisible by the fogs, political and militaristic, hot air and smokes. To wit, let us look at the more peaceful occupations of the people beyond the Rhine. Admittedly, it is not an easy thing to do in these strenuous times, when judgment is often so clouded and opinions are more than somewhat biased. However, last month we visited Leipzig in search of what is new in German plastics and in the machinery for making plastics. Our job was to find something of interest for the British manufacturer, and here and there in the article we publish on another page we hope he will find something of value.

The German nation is often described as the most efficient in the world. It depends on one's definition of efficiency. The German policeman, for example, is nowhere near as efficient as his English or British counterpart, even though he finds it necessary to carry lethal weapons. What is, perhaps, more important, the German policeman is not nearly so handsome nor so kind as ours, which may, perhaps, explain the difference in efficiency. This analogy may have little relation to industrial efficiency. On the other hand it may.

One thing, however, is certain and that is the German is the most hard-working of the Western nations. So much is obvious in almost all walks of life. In addition, it is very ready to spend money on research, it does not expect immediate miracles, and is a past master in the art of applying the results which the combination of hard work and research does bring. Furthermore, the heavy nature of German publicity, generally considered too heavy for our own consumption, does give strength to the sense of efficiency.

We have stated in the article elsewhere in these pages that the Leipzig Fair is the largest of its type we have ever seen. But this statement alone is insufficient to give a clear conception of the difference between it and the B.I.F. There is a great difference in the manner in which machinery, especially, is exposed. Thus, to take as an example, the textile machinery portion of the Fair. The exhibitor does not merely show a few beautiful photographs or a small model of, say, a cloth-weaving machine. He takes the trouble to transport from his factory in, say, Chemnitz the largest of all his machines, something like 20 ft. wide by 50 ft. or 60 ft. long, and proceeds to make real cloth, with beautiful designs on it, by the hundred yards, so that the buyer of the machine is in no doubt of what the real machine can do. A wallpaper machine prints a thousand yards while you wait, and a plastics moulding machine turns out thousands of finished objects in front of you, and, if you are a genuine buyer, you can work the plant yourself. At the B.I.F. it is the rarest of things to see a large machine working, and as for plastic moulding machinery, one would imagine we make very little. We have never seen one working there, and presume the plea would be that the authorities would not permit steam or a motor to be laid on the structure, or "it isn't worth while, since it only attracts the little boys." Well, they consider it worth while in Germany, and so do we.

The above facts and the largeness of the German individual stands and the smallness of ours may be the result of other factors. We may as a nation be very stingy or the cost of B.I.F. stands be much greater than the German ones. This latter cause is highly probable, since we have had many grouses from stand-holders at the B.I.F. with regard to initial cost.

But all that is another matter. We learned a great deal at Leipzig. Many manufacturers would do well to visit it, too—to study German methods and novelties and to apply those which they considered worth while to this country.

New Tannin Resins for Water-softening and Sewage Purification

IN the 1938 Report, just issued, of the Department of Scientific and Industrial Research further information is given about the exchange properties of synthetic resins. It is stated that a high base-exchange value can be obtained by treating sulphited quebracho tannin with formaldehyde, and a resin with a high acid-exchange value can be prepared from m-phenylenediamine hydrochloride and formaldehyde. By treating hard water first with a base-exchange resin and then with an acid-exchange resin, the salts dissolved in the water can be removed.

The exchange values of the resins are dependent not only on the substances from which they are obtained, but also on the relative quantities of the ingredients and other conditions of preparation. For example, the base-exchange value of resin made from sulphited quebracho tannin is dependent, to some extent, on the amount of sodium bisulphite with which the tannin is treated before it is allowed to react with formaldehyde. Quebracho tannin resins, with the highest base-exchange values, are slightly soluble in water. This is an important point if it is proposed to use the resins for the treatment of water for drinking. Experiments have been carried out at the Chemical Research Laboratory, therefore, to determine the extent to which several typical resins may cause contamination of water. It has been found that distilled water may take up organic matter from freshly prepared resins. The soluble matter can be removed from some of the resins however, by extraction several times with hot water. An interesting discovery has been made by the investigators that sodium fluoride, which is occasionally found in certain drinking waters and is known to cause serious dental decay, can be removed by treatment of the distilled water with m-phenylenediamine resin.

Synthetic resins have also been tried out by the Departments of Chemistry and Biochemistry of University College, London, for the Department of Scientific and Industrial Research. In one series of experiments samples of sewage liquor, to which small quantities of finely ground synthetic resins had been added, were aerated for several hours. The resins employed were sulphited quebracho tannin resin, which has base-exchange properties, and m-phenylenediamine resin, which has acid-exchange properties. With the latter the rate of removal of organic carbon from the liquor was increased, but there was little change in the rate of removal of nitrogenous compounds. Quebracho tannin resin assisted the removal of nitrogenous matter, but retarded the removal of organic carbon. The object of these experiments was to compare the resins with activated sewage sludge in the treatment of sewage; it had been suggested that activated sewage sludge has base-exchange properties.

The tannin resins appear to be well worth the close study of the plastics industry. Already a number of patents have been taken out to protect various industrial applications which their introduction has made possible, and work is constantly going on to increase the scope of these interesting and very promising new materials.

BREATHE FREELY

New Type of Respirator Embodies Phenol-formaldehyde Mouldings and a Relief Rubber Face-piece. It Offers Important Advantages over Existing Masks

A NEW respirator, provided with a relief face-piece and so designed that it can be easily adjusted to fit any type of skull, is now being made in this country by the Chema Manufacturing Co., Ltd. One great advantage claimed by the manufacturers is that, if the respirator is contaminated by mustard gas or Lewisite, it can be easily and properly decontaminated without any risk of damage. This is very important because, in the past, respirators have always proved extremely difficult to decontaminate.

The face-piece of the respirator, known as the Chema LPS type, is pressed from strong rubber, so that its shape adapts itself to the contours of the face. The face-piece remains perfectly gastight, even when it is only lightly pressed to the face. It can be worn for long periods in full comfort. Medical authorities who have made a study of the new respirator point out that the noxious space, that is, the space between the mask and the face, is very small and is so shaped that air inhaled through the respirator differs only slightly from the outer air as regards carbon dioxide content. For this reason it is claimed that the wearer of this type of mask does not suffer from headaches or respiratory troubles, even if it is worn for a long time. This applies not only to healthy, full-grown men, but also to women and children. The visors, which are made of heavy laminated safety glass, have a large field of vision, and glasses can, if desired, be worn inside the mask. A channel for breathing leads the air from the container between the visors to their upper end. There it is deflected to the whole surface of the visors and can then only enter the nostrils. Thus the visor glasses remain clear. The valve-chamber, which is moulded of special shock-resisting phenol-formaldehyde resin, is inserted in the centre part of the respirator. This valve-chamber is screwed on to the container by means of a standard thread. The container is so mounted that it does not interfere with the wearer's work in any position.

The Chema gas mask has, in addition, a very important and unique feature, namely, the incorporation in the rubber used for the manufacture of the face-pieces, of a special compound which makes the face-piece a very definite detector of mustard gas and Lewisite. The smallest contact of either of these gases will discolour the rubber and so give immediate indication of their presence.

The respirator has a relief face-piece and differs radically in design and construction from the so-called flat mask. The face-piece remains perfectly gas-tight even when it is only lightly pressed to the face.

The mask can be readily decontaminated with soap and water or, preferably, with a special compound known as Chemit, which is manufactured by the Chema Co. The decontamination can be carried out time after time without affecting the efficiency of the detecting material.

The process to which the rubber is subjected is a patent one known as "sigmatizing," and this can also be employed in the manufacture of paints and varnishes.

The Chema LPS type of gas mask is designed so that mechanics in workshops, chemists in their laboratories and even doctors can work unimpeded when wearing it. There seems little doubt that the introduction of these respirators will prove a welcome addition to our resources both in peace and war. Incidentally, the new respirator should prove very useful in certain industries where the workers are subjected to dangerous fumes and gases, especially as after use the surface of the mask can easily be thoroughly cleaned and neutralized with soap and water.

THIS BEAUTY BUSINESS

BEAUTY may be only skin deep, but it is, at least, deep enough to support a vast new industry specially organized and designed to improve woman's looks and increase her charm. The extent of this industry may be gauged from the fact that women now spend an average of 5s. a month on various aids to beauty, which means £3 a head per annum of the female population, roughly 23,600,000.

Although plastic materials are being fairly generously used in the beauty trade, they are not sharing in its prosperity to the degree they deserve. This is mainly due to the fact that manufacturers of cosmetics and various toilet preparations are not yet fully conversant with the outstanding properties of plastics and the range of materials now available for their use. To sum up, it may truthfully be said that, for some reason or other, the beauty trade has not yet been made fully plastic-conscious and there is still a wide field available for future development. The mirror in every vanity case reflects a potential buyer of good-priced plastic goods, and there is no reason why at least 10 per cent. of that monthly 5s. should not be absorbed by our industry.

In the early days of the industry the use of plastics for beauty preparations was mainly confined to bottle caps of phenol-formaldehyde resin, but to-day the range

The Yardley Beauty Dresser is moulded in Ivory Beetle by Streetly Manufacturing Co., Ltd.

It costs the modern woman 5s. a month to keep smart.

of materials has increased considerably. Although, naturally, utility is the first and foremost consideration, colour is now being generously exploited. For this reason the amino resins are used almost exclusively for a large number of decorative containers and closures. They not only look very smart, but the materials are pleasant to the touch and not as cold as metal, glass or ceramics. One of the most outstanding of recent examples is the Yardley Beauty Dresser, designed by British Industrial Plastics and moulded in Beetle ivory by the Streetly Manufacturing Co., Ltd. The artistically shaped closures for the bottles and caps are also moulded in Beetle. Other leaders in the beauty trade, such as S. Maw, Son and Sons, Ltd., make generous use of Catalin and amino-resin powders for their famous Meritor lines, such as denture baths, cream containers, menthol cones, etc.

Probably colour is the chief selling point of plastic mouldings, and now that powder manufacturers are able to produce even the most delicate tints with considerable accuracy and regularity, great capital should be made of the fact. Even hard-bitten managing directors of firms catering for women's beauty requirements realize that colour will sell goods and, put another way, this simply means that the use of well-designed plastic packs will help to keep their factories busy throughout the year.

The outstanding advantages shared by plastic mouldings are lightness in weight, permanence, as compared with metal, which includes freedom from corrosion, and colourful, attractive appearance. Where transparency is desired, then cellulose acetate is an obvious choice, and many different kinds of boxes are now being made of this material, which, whilst affording full protection

to the various toilet articles, acts as an effective shop window for the goods. Another material of great promise for making containers for high-priced beauty preparations is Diakon. It is more transparent than glass, harder than cellulose acetate and extremely tough. All kinds of delicate designs may be worked on the surface and the material is adaptable to mass-production methods of manufacture.

For over-wrapping packages or individual pieces, such as tablets of soap, there is, of course, no equal to "Cellophane" cellulose film. The use of plain transparent film for soap packing, apart from its function of keeping the tablet clean and fresh in appearance months after it has left the factory, apart also from the attractive gloss it gives to the soap, permits the essential process of drying-out and maturing, so that the soap becomes hard and, therefore, economical in use. Only retailers appreciate the vast difference a "Cellophane" wrapping makes to the appearance of goods. It freshens up the colours of the original paper or cardboard carton and gives even the most commonplace packs a sales-promoting sparkle.

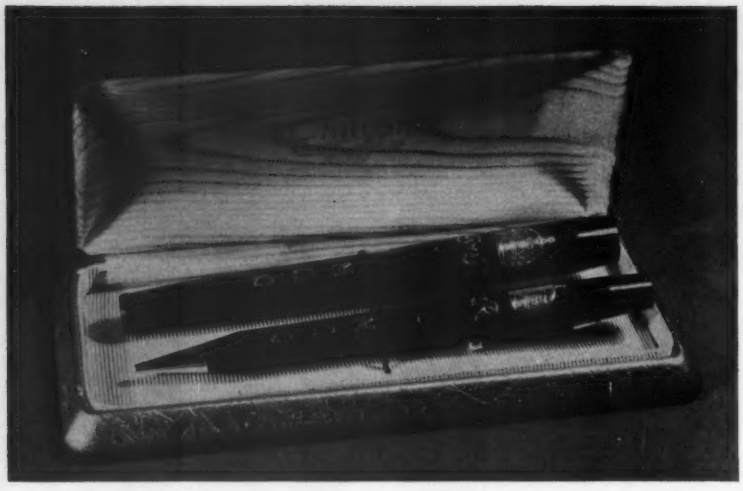
(Left) These Meritor cream or powder containers represent another popular Maw line.

(Below) Moulded eye baths of colourful amino resin powder are now made by S. Maw, Son and Sons, Ltd.

These Meritor denture baths are modernistic in design and perfectly hygienic in use. They are moulded of amino resin powder.

The famous firm of H. Bronnley and Co., Ltd., make generous use of "Cellophane" and moulded containers.

Another group of Bronnley's beauty preparations wrapped in "Cellophane" which adds to their sales appeal

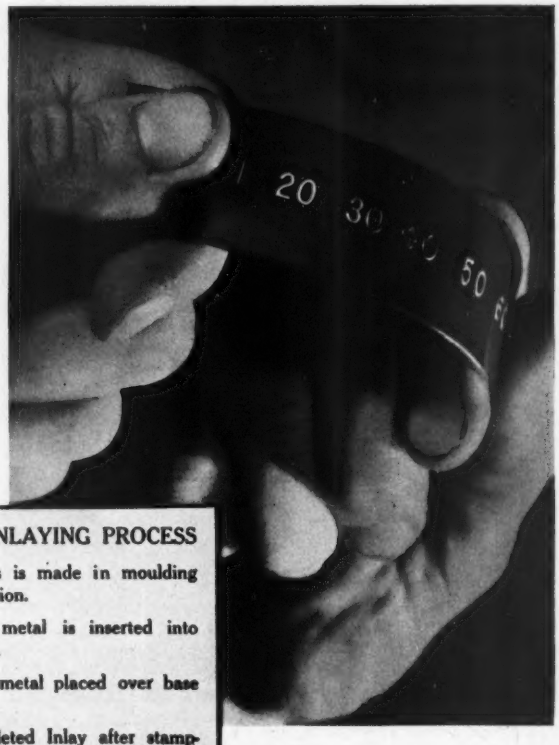


Here is Metal Inlay

ONE is almost tempted to say: "Here is the first metal inlay." Although this is not strictly true, we believe it to be the first developed on a commercial scale with regard to phenol-formaldehyde resins. We have twice shown examples of what has been done in uniting metals and plastics in one artistic whole. The first were those of a French process, which inlaid metal filigree and similar work on to phenol-formaldehyde resins. This has not, so far as we know, been developed industrially. The second process is that of Crystalate, Ltd., who have achieved considerable success, utilizing, however, not a phenolic type of moulding resin, but one based on shellac. It appears that the metal is more easily inlaid into shellac than into the phenol type of resin, from which the inlay is liable to "lift."

The new process we describe here is American and can be applied to the thermo-plastic type of moulding material, such as celluloid, cellulose acetate, etc., as well as the thermo-setting type. Moreover, it gives no mere sliver of metal, lying skin deep on the surface, but a deep-set inlay which "stays put" with the most rigorous mishandling.

As we have so often reiterated in these pages, especially when referring to the queer attitude of that part of the public that looks upon plastics more as a cheap substitute for something or other, we yearn for a realization on the part of the moulder that, for many objects, precious metals and plastics can be wedded with enhanced reputation to both. To-day, Plastic Inlays Inc., of Summit, New Jersey, is carrying out this type of work with complete success, both practical and economical. They are utilizing gold and silver, stainless steel and chromium for a wide variety of purposes, including decorations, initials and names, trade marks and general advertising motifs.



Here are seen metal figures inlaid in cellulose acetate. They "stay put" under flexing.

CROSS SECTIONS OF INLAYING PROCESS

Step 1. Recess is made in moulding operation.

Step 2. Base metal is inserted into recess.

Step 3. Inlay metal placed over base metal.

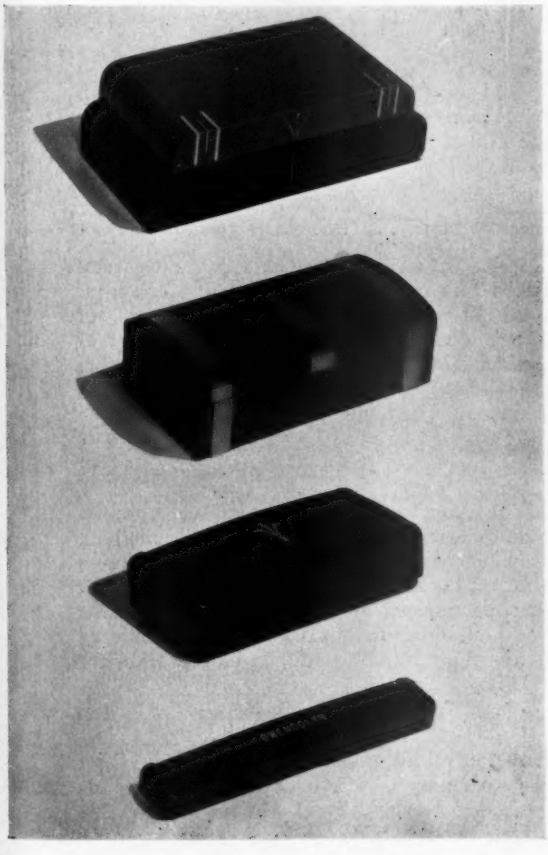
Step 4. Completed Inlay after stamping.

The history behind Plastic Inlays Inc. discloses the need for such inlays in one of the most promising of fields, namely, the fountain-pen industry. The Chilton Pen Co. had long desired a high-class method of decorating their plastic pens and pencils with gold designs, the usual methods having been found wanting since pens and pencils undergo heavy duty. After considerable research a method was elaborated successfully and, as it proved, could be applied to so many objects other than those dealt with by the Chilton Pen Co. that a new company, named Plastic Inlays Inc., was formed.

The process can be described by referring to the drawings herewith. At this point it is well to realize that it is a cold process, the recess for holding the metal being made during the moulding process itself or after the moulding process by means of a pantograph cut. Thus, not only is the process applicable for mass production, but individuality in design is also provided for.

In the recess thus provided is placed a bottom layer of base metal, harder than the metal to be inlaid, so that when top pressure is placed on the inlay the latter spreads, penetrating the plastic walls of the recess, thus becoming permanently locked in place. As will be seen from the accompanying photographs, the possibilities of the process are great, for not only are thin metal rods and plates inlaid flat, but the inlay can be made to go round corners. It may be that the antagonism to the all-plastic radio will be overcome by such means.

We have received from the makers an example of this inlay in the form of a pen and pencil (see photograph at heading). We should be glad to show it to anybody interested in the process.



(Left) Modern caskets. Note how the process can be used with strips or narrow inlays and how they can be made to go round corners.

An ideal use of metal inlays giving artistic relief in a moulded radio cabinet.

Modern clocks by modern setting. Inlay changes the face of many things.

A metal inlay compared with lettering made by moulding.

"General Release"—I

New and Interesting Plastic Goods

TOP honour in the All-America Package Competition was awarded to Martex Towell Mills for their hat-box package. This handsome Lumarith Protectoid container gives depth to the colours of these good towels. The box is made by the Union Specialty Co. Lumarith Protectoid is a product of Celluloid Corporation.

THE growing popularity of moulded containers for pharmaceutical goods is evident by even a most cursory glance at a chemist's shop window. This moulded holder for Genasprin is replacing a similar one made of metal and is supplied free on request from the manufacturers, Messrs. Genatosan, Ltd., Loughborough.

WE should imagine that any little girl would clap her hands with joy at being given one of these smart little Halex toilet sets made by Halex, Ltd., a subsidiary of the British Xylonite Co., Ltd.

THE latest creation in novelties for the cigarette smoker is this combination holder and ash-tray, moulded by Joseph Stokes Rubber Co., U.S.A., of Durez. The holder unscrews from the main body of the unit, which is fitted with a hinged, snap-fastening lid to permit easy removal of the ashes. Top of the body has several large holes for air or idling smoke.

INSTEAD of trying to remove the tinfoil seal from the milk bottle by tearing it off, here is a simpler method. Place this patent milk cap releaser on the foil, press and then lift off the cap. Incidentally, this lightweight foil cap can be retained in use to keep out the dust. The Streetly Manufacturing Co., Ltd., are moulding the cap releaser for Mr. Buisseret, in blue Scarab, for the Express Dairy Co.

THIS novel travel kit, made of cellulose acetate sheet material, contains a variety of face-cleaning pads and is handled in England by D. Harris and Co., 73, Brewer Street, London, W.1.

"General Release"—II

New and Interesting Plastic Goods

HYGIENIC in use and dainty in appearance, this Milton denture bath is proving very popular and useful. It is moulded in Beetle by the Streetly Manufacturing Co., Ltd.

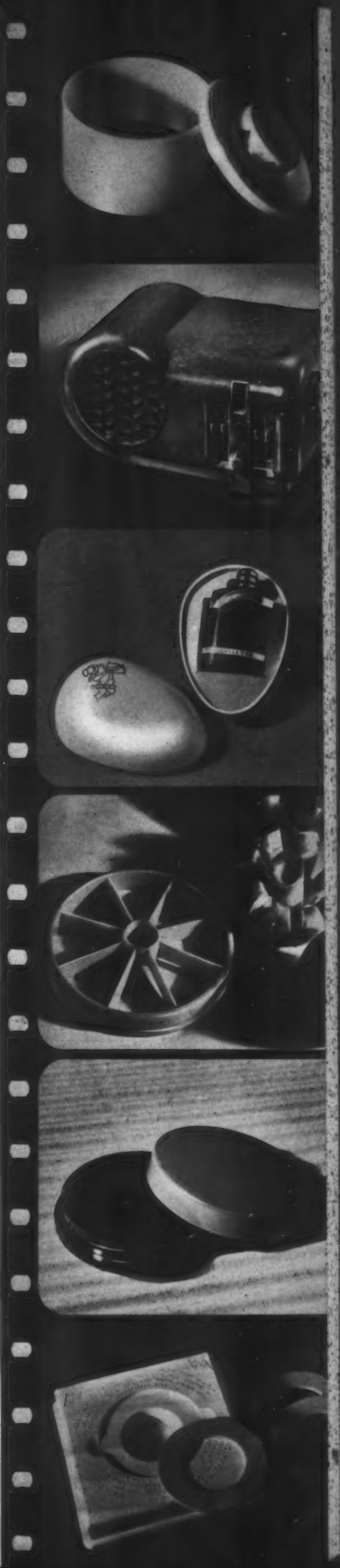
HERE is a new Durez moulded housing for the famous Stewart-Warner table radio, now a best seller in America. The housing is moulded by Firestone Tyre and Rubber Co. Durez is a phenol-formaldehyde moulding powder manufactured by General Plastics, Inc., North Tonawanda, N.Y., U.S.A.

THE Saville Egg, moulded in Beetle ivory by the Streetly Manufacturing Co., Ltd., is an ingenious package for their "Mischief" perfume, and is proving a very seasonable and welcome gift just now.

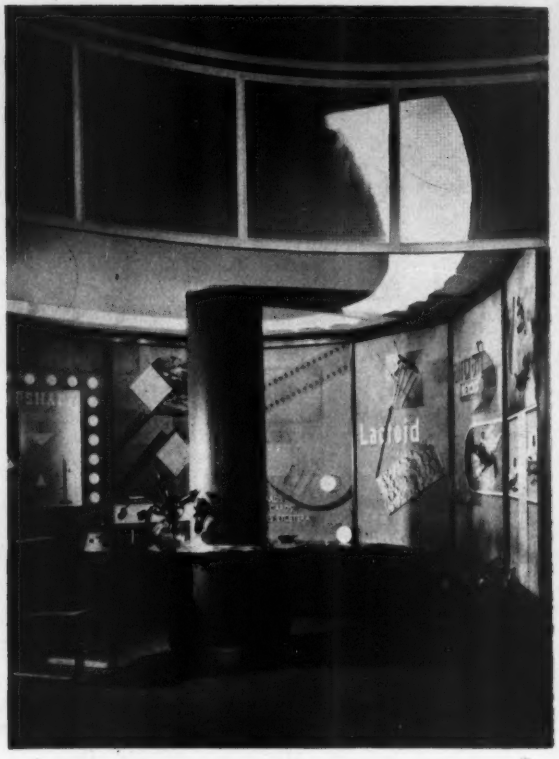
KNOWN as "Corancut," this ingeniously designed moulded device for the instant coring and slicing of apples and pears, is now available at many of the popular stores. It is moulded of red amino resin powder and is very sturdy and strong.

MOULDED by Universal Metal Products, Ltd., for Messrs. F. W. Hampshire and Co., Ltd., Derby, this neatly designed and sturdily moulded container has a green lid and black base of phenol-formaldehyde material. The plastic container is being used to hold "Dewies," which is the trade name for a well-known brand of cleansing pads.

POULTRY farmers should find the Bibby Egg Comparator of great assistance. The device, which is made up of a tray portion in white with five rings in different shades of yellow, is moulded of Beetle by the Streetly Manufacturing Co., Ltd. To use the Comparator, the yolk is separated from the white and beaten gently in a cup, avoiding air bubbles, and it is then put into the centre of the white moulding and tried with various rings until the ring is found which matches the colour of the yolk.



View of the Development Gallery showing Bexoid lighting fins. The display includes such well-known B. X. products as Bexoid injection moulding powder; Cinabex; Lampshade Bexoid; Super-Armourbex and Bexoid film.



Development Gallery showing Super-Armourbex glazing and transparent Bexoid table round column. Cork screens are removable so that displays can be interchanged.

SHOWING OFF PLASTICS

The British Xylonite Co., Ltd., and their subsidiary companies are justly proud of their New Showrooms which embody new ideas in interior decoration and make ingenious use of many of their own materials

SHOWROOMS are usually dull places, crammed full of merchandise and not in the least likely to inspire the visitor with very much enthusiasm about the goods of any particular industry. It is, therefore, a very welcome change to come across new ideas and new methods in the presentation of goods which mercifully shun the dreary traditions and precedents of the old glass-showcase method.

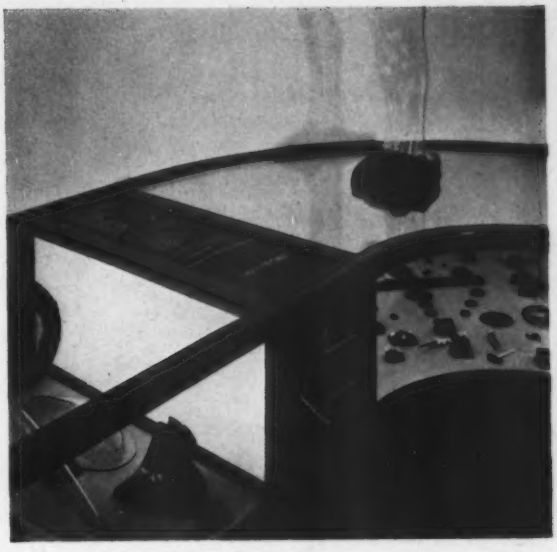
The new showrooms of the British Xylonite Co., Ltd., 4-7, Chiswell Street, London, E.C.1, are really a clever combination of exhibits and interior design that is as satisfying as it is novel and which, without exaggeration, may be called an architectural event. Mr. Walter Landauer, of Industrial Design Partnership, who was responsible for the work, has made notable use of thermo-plastic materials in the equipment and finishing of the rooms. Particularly interesting are the door handles of steel tube covered in coloured Bexoid, the laylight of embossed Bexoid sheet, the transparent partion of Super-Armourbex, the Bexoid fins applied to inverted trough lighting, the display shelves covered with Bexoid which encloses fabric permanently moulded into the material, the Lactoid lettering on doors and display panels, and the illuminated wording on the showcases formed by engraving the required letters in the top layer of a two-coloured laminated Bexoid sheet.

This new plastic centre should achieve a two-fold purpose. In the first place, it will form a pleasant and convenient rendezvous for the customers of the British Xylonite Co., Ltd., and its subsidiary concerns, and will also prove a centre of instruction to those in industry who are interested in the possibilities of using plastics for new applications and who desire first-hand information from one of the real pioneers of the plastic industry.

The showrooms are really divided into two broad sections. The first is devoted solely to the goods of

Halex, Ltd., and consists mostly of toilet ware and general fancy goods, whilst the second is representative of the work now being carried out by the customers of B.X. Plastics, Ltd., using Bexoid, Xylonite and Lactoid. To illustrate the latter there are nine showcases, each one being reserved for a particular industry or group of trades. For instance, there is a case containing examples of stationery and office equipment fabricated of Xylonite, Bexoid and Lactoid. Such important trades as the electrical, optical, transport, dress, footwear, etc., all these are illustrated by actual examples of work in one or more of the company's products.

The most spectacular and original part of the showroom is the Development Gallery, which is designed and planned to show recent applications and methods of working Bexoid, Xylonite and Lactoid. There are, for instance, the latest blowing dies, moulding dies and working tools, as well as a number of blue prints of some of the most important tools used by Halex, Ltd. All these exhibits are accompanied by instructive and descriptive matter, which usually takes the form of large photographs and drawings, calculated to be of the greatest possible assistance to newcomers to the plastics industry. In addition, there are a number of large photographic murals, which show, in detail, the various key stages in the manufacture of season-ticket holders, toilet ware and many other mass-produced articles.



Detail of B.X. Plastics display case showing engraved Bexoid panel. On the right-hand side are various examples of dress accessories and on the left are shown B.X. plastic applications in modern transport.

Looking towards Development Gallery. B.X. Plastics exhibition on left. Arranged according to trades, each showcase contains articles made by the Company's customers from their plastic materials. The blue and white panels are engraved Bexoid. The transparent display leg is also made of Bexoid. The rod supports are covered with red Bexoid tube by the Exceloid Company.

One of the chief features of the Halex Showroom is the suspended display shelves illuminated by indirect lighting. As will be seen from the photograph, this form of lighting enables the goods to be seen to advantage. An interesting feature is the Bexoid-covered fabric used for the tops and back of the shelves. This material has a pleasant texture and can be cleaned with a damp cloth; an important point where shelves are not protected by glass windows.

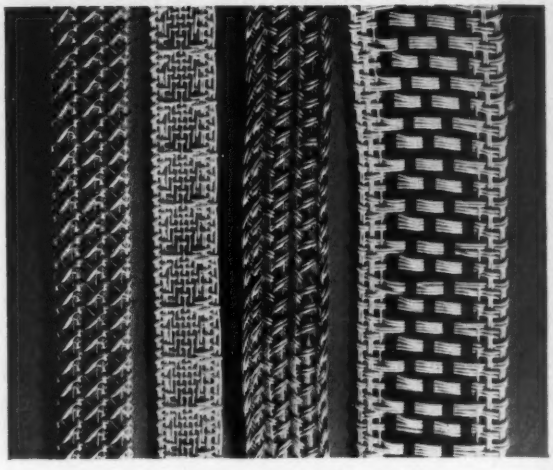
Apart from the value of this new centre to the plastics industry, it is to be hoped that architects and interior designers will also accept an invitation to study at first hand the many interesting and novel uses which are made of both cellulose acetate and casein. The applications of the former material vary from a useful and eminently practical umbrella stand to kick-proof skirting boards.

PLASTICS for FOOTWEAR

ALTHOUGH it may not be at once obvious that the boot and shoe industry is making greater use of plastics, it is a fact that, during the past twelve months, many more applications have been found for plastics and a considerable amount of interest and ingenuity shown in the adaptation of plastic materials to suit the highly specialized requirements of the footwear trade. Experiments have been carried out to perfect a plastic suitable for moulding lasts and, although this has not yet been discovered, strong hopes are entertained that a satisfactory solution to the problem will eventually be found. The perfect plastic last would prove a great boon to the shoe industry, as its use would cut down waste and help very materially to standardize production. When the plastic last had outworn its usefulness, it could be softened for reuse, which may or may not entail melting down. Nails would have to be removed and the material recast or moulded so as to make a new last. Such a simple procedure would cut out a great deal of waste, which is now unavoidable in the case of wooden lasts, and also reduce the ultimate cost of production. Naturally, it is not easy to discover a plastic material endowed with the necessary properties: it must be strong, shockproof and resilient, able to take nails in the same way as wood without cracking or splintering and yet easy to melt down and recast to make new lasts. Incidentally, it is of interest to note that at least one large company, manufacturing rubber bathing shoes, has tried out the idea of using moulded Beetle formers on which to vulcanize the rubber, but, unfortunately, their experiments were unsuccessful. The idea does, however, appear to be well worth exploiting, when once the initial difficulties are overcome.

One of the most interesting uses of plastics in the shoe trade is represented by the scuffless heel. This consists of a shaped wooden core covered with black or coloured celluloid sheet material about 12-15 thousandths of an inch in thickness. This sheet is soaked in methylated spirits and, when suitably softened, it is wrapped round the wooden core and forced to adhere. The surface of the heel is able to stand up to abrasion and rough use without any tell-tale marks and, for this reason, the heel is becoming very popular. Quite a large number of moulded heels in Beetle and other materials are used in Australia and apparently meet with all practical requirements. Bakelite has also been used for moulding heels and heel shells.

One of the latest and most important developments in the shoe trade has been the adoption, in America, of a new injection moulded cellulose acetate heel, made by the Plastic Department, General Electric Company, which has an ingenious honeycomb construction. By providing a number of vertical holes in the upper part of the heel, arranged with their openings close together over the upper surface, the acetate is made nailable. These holes are slightly smaller than the nails used on standard attaching equipment, and when the nail is driven through the leather into the heel with a hammer-like blow, the thermoplastic material gives slightly and then springs back to grip the nail and hold it permanently. If the nail misses one of the holes, it is either deflected into the nearest one, or is driven right into the material itself. Since the plastic is



Examples of lacquered braids for the shoe and fancy goods trades. The lacquering is done by a special process carried out by Rotalac, Ltd., Lymm, Cheshire.

Attractive ladies' shoes are now being made up embodying the use of lacquered fabrics. For the lacquering, celluloid is used and ensures a very strong and durable protective covering for the fabric or leather base.

This photograph shows how the scuffless outer covering of celluloid (Xylonite in this case) is wrapped round the wooden core to make an exceedingly strong and durable heel. Large quantities of celluloid are now being used by the footwear industry for this purpose.

The patented honeycomb construction is visible in the upper part of the Textolite heels, developed and moulded by the Plastics Dept., General Electric Co., U.S.A. This hole construction makes the all-plastic heel nailable with standard shoe machinery.

resilient enough, there is no danger of cracking or splitting. Incidentally, the Pearson Heel Co. have developed a new snap-in lift for these plastic heels.

Besides providing the necessary resiliency, the colour possibilities of cellulose acetate give the heels another great advantage. Since it is available in such a wide range of tints and shades, many shoes will use the heels without any coating or covering whatever. Some have been made up in magenta, brown, gold, green and black. The lustre of the material and the fact that the colour cannot chip or peel make it doubly attractive in stylish modes.

Another use of plastics takes the form of lacquered textiles, braids, cane, leather lacings, etc., which are made up into fancy footwear for both the home and export market. Messrs. Rotalac, Ltd., Lymm, Cheshire, have developed a special process for lacquering materials, such as cotton, silk or linen yarns, braids, tapes and the like, also aluminium and other wires. These lacquered materials are in turn woven, crocheted and braided to produce the various types of materials. The shoe trade is absorbing most of this lacquered work, but other outlets in the fancy goods trade are being found.

The bulk of the eyelet or lace holes on boots and shoes are made of metal, heavily coated with a strong abrasion-resisting celluloid, but during recent years increasing use has been made of eyelets stamped out of celluloid sheet, also moulded eyelets, and many millions of these are used by the shoe trade during the year and apparently give full satisfaction. Lace tips or tags, heel plates and toe puffs are also made of celluloid; the last named are often built up of fabric impregnated with celluloid solution.

Continental novelty lines sometimes make use of cellulose acetate sheet material for soling beach shoes and some examples of Rhodoid-soled footwear were shown in our issue of February. The Rhodoid used was fluorescent and glowed slightly, even in ordinary light. Both celluloid and cellulose acetate are also widely used for making shoe forms for use in window dressing and large numbers of these are to be found in retail shoe shops. The British Xylonite Co., through their subsidiary, B.X. Plastics, Ltd., have developed a healthy connection with the shoe industry, where generous use is made of both Bexoid and Xylonite.

An American company, J. J. Albrecht and Son, have recently put on the market a new type of shoe pattern called Da-Lite, in which the opaque fibre has been replaced with transparent cellulose acetate. The guiding edge is bound with metal, to prevent inadvertently cutting the pattern. Through the use of these patterns shoe cutting is greatly simplified, with a resulting saving in time and leather impossible to measure. Imperfections are easily avoided, because the cutter can see through his pattern without lifting it and can move it about to bring his pattern so close to the imperfection or break that no leather is wasted.

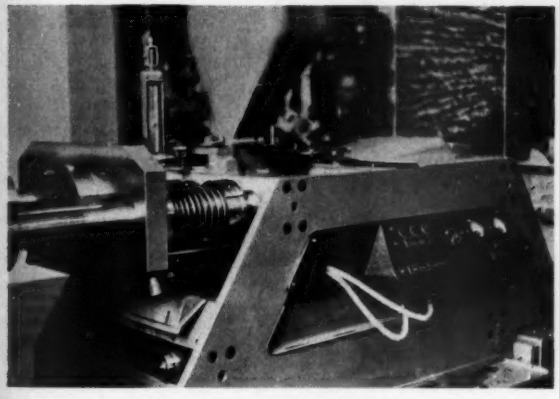
Both casein and the cast resins are extensively used in the manufacture of buckles and various ornaments for use on ladies' evening footwear. It is interesting to note that when casein material is used for shoe novelties some very attractive results can be obtained by dyeing the casein after polishing. This makes it possible to produce articles in large quantities in one colour, which can then be dyed to any shade desired. Multi-colour effects may be obtained by dyeing and recutting. An increasing number of these small decorations are also being moulded of cellulose acetate on automatic injection moulding presses.

SPRING FAIR, LEIPZIG

(Above and right) Two views of the Exhibition Buildings within the town. (Below) The great Engineering Fair situated two miles out of Leipzig.

LEIPZIG as a Fair centre is older than the B.I.F. by nearly 700 years. It can be taken, therefore, that the Germans know a great deal about such matters in general and that we can learn a lot from them. The age and tradition of the Leipzig Fair explain in large measure why it has become what must be the greatest European centre for the buying and selling of goods. Its age and tradition are also probably responsible for one drawback—its scattered nature. Perhaps "drawback" is rather too harsh a word to employ, since it was a drawback only to the writer, as will be explained later.

The Exhibition of Injection Moulding was situated in the Engineering Fair between Halls 8 and 9. In this exhibition—



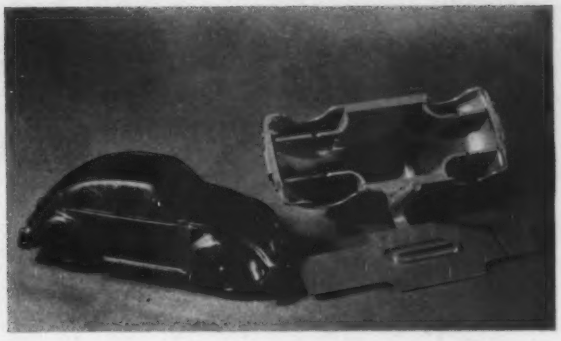
—we saw several machines, including this Eckert and Ziegler automatic, which was turning out—

The Leipzig Fair resembles closely our own B.I.F. in its fundamental aspect, namely, it exists as an organization to sell and buy goods. It does not bear any resemblance in form to the exhibitions which have been held all over the world, e.g., Wembley, Glasgow, Paris, New York and in Germany itself elsewhere, to show the people of these countries and the world outside in spectacular form what the country can do. The Leipzig Fair is for the real buyer and not for the public, so that outward artistic and striking embellishment is more or less absent.

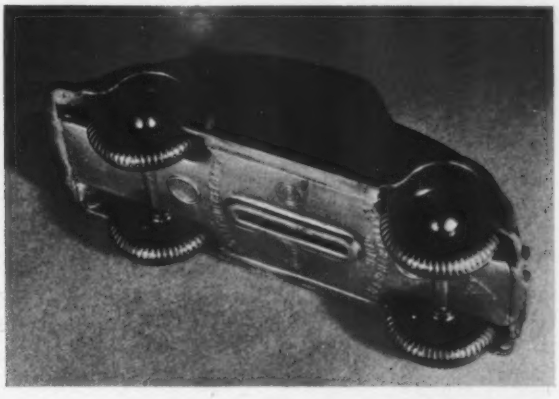
For the benefit of those who may wish to visit Leipzig on future occasions, it may help to describe the location of the Fair.

In this country the B.I. Fair is very closely confined under two, or, more truthfully now, under three, roofs; Olympia and Earls Court for general goods and at Castle Bromwich for engineering, metals and the heavy types of industries.

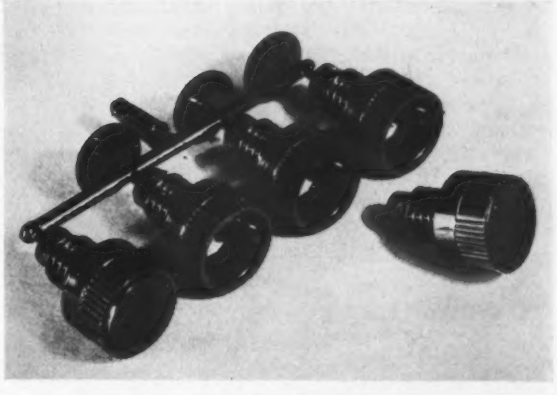
The form the Fair takes at Leipzig is very different, better in some ways than the B.I.F., less good in others, and is a direct result of its very long history. The lighter industries are not under one roof and are scattered in the old town in large buildings, but of no great pretension, sometimes merely on one of two floors of a building. Thus, to give a parallel, toys and musical instruments might be in a building in Holborn, while paper goods and office requisites are in Piccadilly. Yet another exhibit might be in the underground station



—the top and base of this toy or money box as easily as "shelling peas."



The completed toy after the axle and wheels and the base have been incorporated.



Another E. and Z. machine was manufacturing these radio knobs, utilizing a very intelligently designed mould.

at Oxford Circus! This may be no drawback to the real buyer, who knows where to go and who goes for one or two things only, but it is rather confusing and troublesome to newcomers. To us who wanted to see every industry it was more tiring than troublesome.

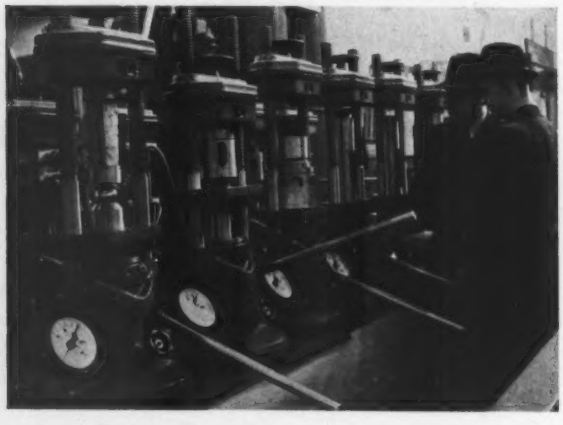
Any criticism we have, however, quickly vanishes when we consider the Great Engineering and Building Sections situated about two miles out of the centre of Leipzig, for this is the most coherent and magnificent exhibition we have ever seen, and certainly the largest. The entire Castle Bromwich show could be lost in one corner of it. Indeed, it is so big that no such thing

This we presume was the first moulded motorcar door ever seen by the public. It was moulded by Auto Union.

as one roof is possible, and each section, e.g., Textile Machinery, New Building Materials, Metals, etc., are in separate enormous buildings. Altogether there are 21 sections in the Engineering and Building Fair!

But to get to the real subject of plastics. Here, I fear, we were grievously disappointed. Not because there was little to be seen, but merely because there was no collected exhibit of plastics. This grouse is rather a private one, for it affected us so much. We had to wander far and wide to find out what we wanted. This state of affairs is very different from the B.I.F., where an excellent comprehensive exhibit was seen.

There is, of course, a good reason for this dispersion, although it is no excuse for the absence of a collected exhibit. When plastics first "grew up" they entailed an advancement in the finished goods of the electrical industry, and therefore were shown only in the electrical section of the Fair. When plastics were employed in the manufacture of fancy goods and toys they were then shown in those halls especially devoted to these industries. So much we understand, but we feel that in addition a collection showing the whole gamut of plastics would be an advantage, especially to those buyers whose industries have not yet been affected by plastics. At Olympia we often encounter examples of the latest goods in plastics at, say, the furniture, the clock and the building exhibits, in addition to the main collection at the Plastics Section. The Germans



Werner and Pfleiderer, the well-known makers of mixing plant, showed an excellent range of laboratory presses.

may reply to this by saying that elsewhere, e.g., Dusseldorf and so on, composite plastic exhibits have been seen. Let us hope, however, that there will be a real Plastics Home in Leipzig on future occasions.

Exhibits of Plastics

We must begin our real job of reporting by a retraction of some of the above remarks. There was one composite exhibit, and a very important one, too, under one roof. It was the Exhibition of Injection Moulding situated in the Engineering Fair, and although it included only three exhibiting concerns it was as complete and as fascinating as one could wish. The three were Franz Braun, makers of the Isoma injection moulding machine; Eckert and Ziegler, makers of the equally famous E. and Z. injection moulding plant; and thirdly, Venditor, the great German sales agency for the well-known raw materials for injection moulding, Mipolam (polyvinyl resin) and Trolitul (polystyrol resin).

As the reader can well imagine, it is not the first time we have seen this type of machine working. In England we have seen them turning out combs, electrical parts, bottle caps and fancy goods by the thousand. But we never see them without reflecting on the way they have, for good or ill, affected industry so profoundly. And here again while we watched the same feeling took hold of us.

At the stand of Franz Braun A.G. there was a machine, completely automatic, out of which dropped every minute or so a translucent cream-coloured drinking beaker, capable of holding ½ pint of liquid. Thus while we were watching a portion of the pottery industry was disappearing from the control of the potter. And except for the occasional loading of a hopper no worker was visible! True it is that the pottery industry has already been affected by the thermo-setting type of resin, but not by such rapid nor such stealthy means.

And we had only to look at the Eckert and Ziegler machines to prophesy the coming of a very drastic change in the toy-making industry. Here was an automatic machine that literally opened our eyes, for it turned out in one shot the main parts of a toy motorcar —a miniature People's Car with a slotted base, so that the toy also becomes a savings box for odd pfennigs and marks. It is made from Mipolam, and all it needs is the tyres, also of Mipolam, for its completion. These are put in and the base is sprung into place. No screws, no metal, no painting. If you are an economist you might like to answer a new problem—where will the new toy industries of the world be situated? Certainly not in the villages of Germany or Japan or Central Europe. Imagine what complicated toys and gadgets can be turned out by these machines.

On the same stand another E. and Z. automatic machine was turning out radio knobs at a high rate, and from a most ingeniously designed mould. The circular cap portion was separate to save material, and was sprung in position into the hollow knob after being detached. Certainly design of moulds for injection appears to be a most fruitful field for the display of ingenuity and for the saving of material and money.

In this building there was a second Franz Braun machine, especially noteworthy because it was an injection machine of the vertical type, the first and the largest we have yet seen. It is capable of producing objects of very large size up to 250 grams in weight.

It seems strange to begin our notes with the most modern of processes employed in the plastics industry, but it was certainly the most striking of all the plastic

machinery exhibits. In any case, it is difficult to be logically sequent in an admittedly, for us, higgledy-piggledy plastics exhibit.

Venditor, the organization we have already mentioned, exhibited their products in different halls. In the Injection Moulding Building there were shown samples of Trolitul and Mipolam, the heat plastic resins.

In addition, there was in the Electrotechnics Hall a more complete exhibit with the full range of raw materials this company sells—Mipolam and Trolitul, as previously mentioned, Trolit (cellulose acetate) Trolitan (phenol-formaldehyde resins), Pollopas (urea-formaldehyde resins) and Ultrapas. This last-named resin deserves some notes on its own for it is the first time we had seen any of this new material, which we believe has not yet reached this country, and the first time, therefore, we had seen any articles made from it.

Ultrapas (or Melamine) is a new thermo-setting resin which, it is claimed, is easier to work than the urea resins and gives more beautiful results. It is manufactured from formaldehyde and aniline, and although such resins have been made before in this country and in the U.S.A., none, so far as we know, has appeared on the plastics market. The examples of finished goods we saw were extremely beautiful and "rich." It is stated to be very resistant to hot water, fruit acids, vinegar, mustard and fats, so that its use for cups and other food containers is indicated.

In yet another hall devoted to heavy machinery, Venditor showed materials for bearings and toothed wheels. Much of this we are already familiar with in England. Lignofol, however, a highly compressed resin-impregnated wood, appears new. Certainly the enormous bearings, more than 2 ft. across, seemed noteworthy achievements.

Automobile Bodies

It was in this same hall that, while walking rather aimlessly about, we encountered what might be to some the most important exhibit of all. We wandered round a stand labelled Ausschuss für Wirtschaftliche Fertigung, one of the many State or semi-State organizations which can give advice on new processes and new machinery. Judge our amazement when we saw something tucked away in a corner that had fluttered the plastic dovecotes of two continents at least—a whole motorcar door moulded in solid plastic of the phenol-formaldehyde type by the Auto Union, whose patents we have been publishing of late in these pages. The raw material is a Dynamit A.G. product of the "presstoff" type; that is, a flock impregnated with an emulsion of resin in water and then cured. It appears to be a very tough structure capable of withstanding a great deal of wear. The "natural" colour is a mottled dark brown and so must be painted. The photograph of this door shows the several coatings painted on it.

"Venditor" of Troisdorf exhibited a wide range of raw materials, including Mipolam, Trolitul, the new resin Ultrapas and finished goods made from them.

THISTLEDOWN

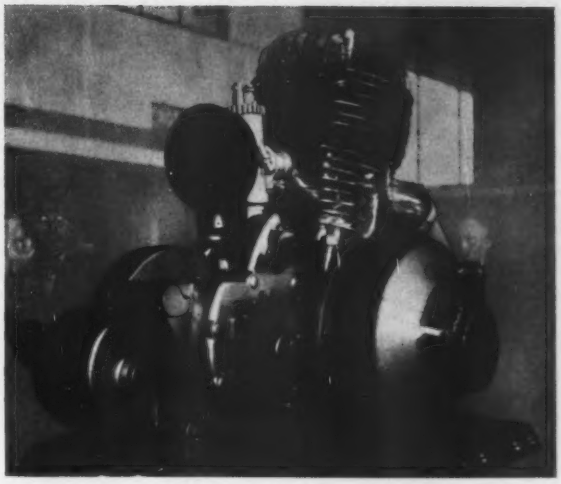
The loveliest plaque we have yet seen. Engraved by Meta Deutsch on Plexiglas, the German acrylic resin sheet, it occupied the place of honour on the stand of Röhm and Haas at the Leipzig Fair.

Encountering this in such an unexpected spot made us wonder how much we had missed. Indeed, it was also by accident that we encountered the most beautiful exhibit in plastics we have yet seen. Röhm and Haas, the manufacturers of Plexiglas, the German equivalent to our Perspex, had their exhibit in a corner of a hall devoted to metals. Heaven knows why this was so, but as the exhibit was the most magnificent I have yet seen, we need not worry. This beautiful resin, more transparent than glass, becomes probably the most wonderful of all raw materials in the hands of the artist or technician. There were hundreds of articles made of it, from dressing-table objects to optical instruments and aircraft windows. But by far the most wonderful was a transparent oblong panel engraved in the Black Forest by a woman artist—Meta Deutsch. So enchanted were we with this that we publish a photograph of it alone on the opposite page. The reader can well imagine this cannot give the full beauty and delicacy of the original. We offer our congratulations to the lady and to Röhm and Haas.

Of hydraulic presses and the like, there were one or two outstanding manufacturers. C. and W. Berges, of Marienheide/Rhld, exhibited an automatic machine for thermo-setting resins—automatic, that is, except for the loading of the powder. It was remarkable to see it working, making two "breathing" lifts before the final cure. Both phenol and urea-formaldehyde powders can be moulded in it. Mr. Windsor, of Technical Machines and Accessories, told us that he hopes to introduce the machine here.

We saw a somewhat similar machine at the stand of Gebr. Battenfeld, of Meinerzhagen (Westphalia).

There is little more to relate, at least little more that we saw. It was, however, interesting to note to what a great extent transparent sheeting was used as a covering to show the inner workings of moving machinery. The best example was at the Auto Union stand. I suppose 99.9 per cent. of the people know exactly how an internal-combustion engine works, yet



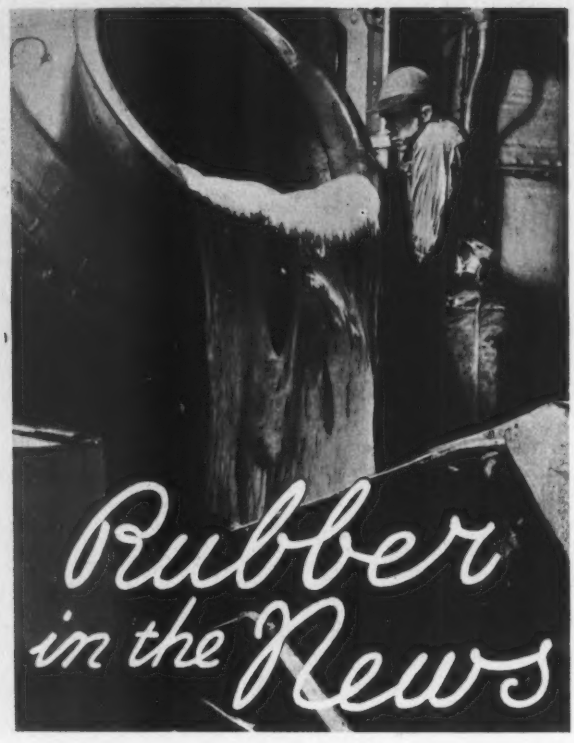
Auto Union employed a transparent plasti with great effect to show what happens inside a cylinder.

the enormous model of one at this stand attracted thousands—ourselves among them. It was a perfect working model in transparent plastic which showed compression, ignition and exhaust in a vivid manner.

One of the most spectacular of exhibits was that of Bakelite G.m.b.H. Situated in the middle of Leipzig's oldest and largest squares, it contained a vast range of objects moulded from the resins made by this concern.

Curiously enough, there was an underground exhibit in the same square—just as if it were in the Piccadilly Underground ticket hall. We were ready for surprises but not for the fact that here was the stand of the famous Kurt Albert company, which manufactures the well-known Albertol resins. We saw at this stand a more or less complete meat mincer. This is ousting metals with a vengeance.

In addition to the well-known oil soluble Albertols, this company manufactures moulding powders of all types.



This photograph was reproduced in the first issue of "Neoprene News" published by the I.C.I. and depicts a scene in the production of Neoprene.

★

According to the aeronautical correspondent of *The Times*, writing in a recent issue, the De Havilland Aircraft Co., Ltd., are now making use of rubber for reinforcing plywood. The wing for a new Moth Minor employs two layers of plywood, with a fairly thick layer of aerated vulcanite between them. This sandwich material is shaped to form the shell of the wing, and inside it there is nothing but the three webs of reinforced wood, joining the upper surface and the lower and running along the whole span at about equal distances from each other. In effect, *The Times* correspondent goes on to say they divide the interior of the wing into three compartments, one of which may be treated with a synthetic rubber material and used experimentally as a petrol tank. The webs are attached to the upper and lower surfaces by rudimentary flanges let into the composite skin structure, and to that extent they represent spars, but for all practical purposes the wing is hollow and empty. The plywood is united to the packing by a special cement, and a similar method is available for the same light vulcanite packing in association with Alclad for metal aircraft.

★

The use of special rubber mountings in church belfries is now a practical proposition as the result of an interesting and potentially important experiment carried out at a new church in America. According to the April issue of *Scientific American*, the architect of a new church at Fries, Virginia, refused to install an old 1,900-lb. bell in the new building without expensive structural alteration, because he feared that the vibration caused by ringing the bell would, in time, weaken the structure and possibly lead to an accident. Then one of the officials of the Washington Mills, large textile manufacturers located in the same town, suggested that an attempt should be made to install the bell on rubber mountings. As a result, it was mounted on four Vibro-Insulators supplied by the B. F. Goodrich Co. These rubber-to-metal shear-type mountings are designed to carry a maximum load of 500 lb., so one was attached to each of the four legs of the bell frame. Tests were then made and showed that all damaging vibration had been eliminated. This rubber permitted a tradition to be upheld at small cost and with complete safety.

★

E. I. du Pont de Nemours and Co., Inc., announce that a new odourless form of Neoprene is now available and recommended for specialized domestic and industrial applications. This new product is known as Neoprene Type G and is said to possess even better physical and chemical properties than ordinary Type E Neoprene. There is no doubt that the commercial production of this improved synthetic rubber will greatly increase applications and open up a number of new and profitable markets where an odourless, grease-resistant rubber is required.

★

The two outstanding developments in present-day printing are high-speed presses and instantaneous drying inks. By means of the former, printers now print 48 pages in less time than it took to print eight a few short years ago. Quick-drying inks, meanwhile, have given printers everywhere the opportunity to improve quality and, at the same time, increase printing production. It is equally true, however, that one great pitfall has, up to now, obstructed the path of printers anxious to utilize these two major developments. This has been the lack of a roller which would stand up when used for high-speed, quick-drying-ink printing. The new Thiokol printing rollers announced here are important because, as the manufacturer states, they do stand up in this modern printing, and stand up well.

Thiokol rollers have proved successful for high-speed, quick-drying-ink printing, it is reported, because they resist entirely the oils and chemicals which make up the newer-type inks. It is also said that Thiokol rollers are so stable that they perform with the same high degree of efficiency in hot weather or cold. They are likewise unaffected by highest printing-press speeds and stand up excellently under all possible combinations of printing conditions; thus ensuring 100 per cent. service.

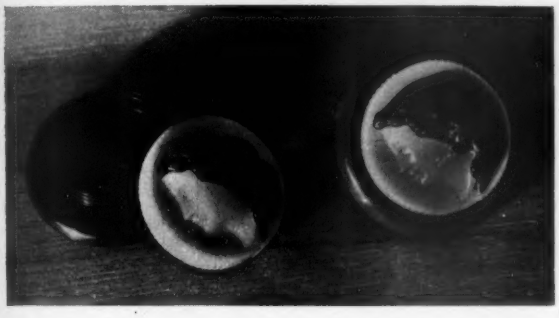
The base material for Thiokol rollers is the crude synthetic rubber supplied to roller manufacturers by Thiokol Corporation. Actually, the rollers are made from complicated compounds developed only after months and months of painstaking research. The first acceptable compound produced in a manufacturer's laboratory was made up into a roller for use on a rotary magazine press using flash-dry inks. It worked. Further experiments were conducted and continued until the researchers had a series of compounds which gave a soft, a medium, or a hard roller. Thiokol rollers, thus developed, and now in use for months in some of America's greatest printing establishments, will hardly swell when used with vaporin or flash-dry or heat-set inks. In the presence of these inks the rollers stay moist and do not permit the inks to dry on the surfaces of the rollers, thus assuring a smooth, even reproduction result over all.

Ideas—

By the EDITOR

Here's an ingenious and highly decorative button which serves two purposes. First of all, it can serve a distinctive and attractive purpose on a dress merely as a button. Secondly, the hollow receptacle forming the base of the button can be used for deodorant, rouge, solid perfume, etc., and forms a very cunning hiding place. Incidentally, this button

New Beauty Aid Button



embodies a new development in moulding, which is known as the Colt Index System. The face, then the hair and then the cover being moulded in consecutive order and finished without the use of paint or any foreign colouring matter. Colt's Patent Fire Arms Co. are responsible for the Beauty Aid Button, and we understand that there is a large demand for this novelty in the United States.

The older plastics are as prolific of ideas as the newest. By the aid of rubber the self-sealing petrol tank, proof against machine-gun bullets, is now being manufactured, so the *India-Rubber Journal* tells us, and may be specified for R.A.F. aeroplanes. Such tanks are already being used in France for aircraft and for motor boats. The metal tanks are given a coating of rubber of the aerated type, the structure being full of bubbles, each isolated from one another. A leak of petrol in one of these cells cannot, therefore, readily communicate through other cells until some period has elapsed. Moreover, when a bullet passes through the structure the tension of the rubber tends to close the hole. It is also claimed that if the hole is a jagged one, the leakage of petrol causes the rubber to dissolve and make a sticky solution capable of sealing the aperture, at least temporarily.

Leakproof Tanks

About a year ago we had a visit from an inventor, who showed us a novel type of cotton reel made by stamping out from cellulose acetate. We suggested that the most economic method of production would be by the injection moulding process. While on the B.I.F. stand of Insulators, Ltd., we noted the very reels, and were informed that this concern is now moulding them by the injection process for J. and P. Coats, Ltd.

Sewing Thread Reels

As will be seen, the idea is very ingenious, the cotton thread emerging from between the two plastic portions, and since one-half of the reels have been moulded in transparent cellulose acetate the colours are readily visible. Moreover, since the reels shown hold 80 yds. of thread and are only about 1⅛ ins. in diameter and ⅜ in. thick, they are a great improvement over the old type of wooden or cardboard reel.

Some time ago an English reader asked me whether it was possible to make a matchbox holder from plastic materials. I replied saying that it was possible, although extremely difficult to make one from phenol-formaldehyde moulding powders, and that the finished article would not be strong enough. I thought the only possibility would be by injection of a thermoplastic material.

Matchbox Holders

Furthermore, since I knew the inquirer well, I asked

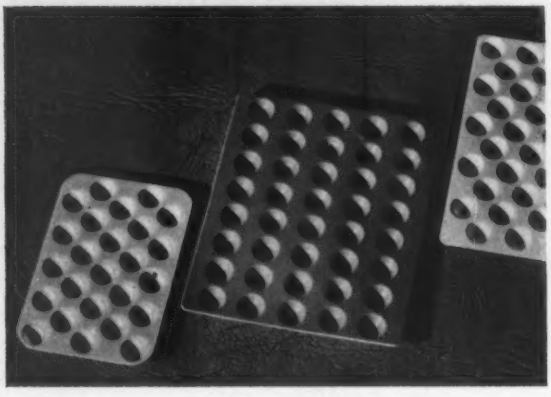
what on earth was the purpose of a matchbox holder? I've seen plenty of them, but I do object very strongly, on general principles, to making useless things, and to me this is about the most useless object one can imagine. Surely the ordinary matchbox does not require protection from wear? The only possible reason can be to give the box an improved appearance, not in itself very justifiable.

However, judge my amazement when I visited the

Eckert and Ziegler stand and was presented with one made on their injection machines. It was extremely strong and made from a deep maroon-coloured Trolitul. In fact, it enhanced the appearance of the matchbox itself so effectively that I almost changed my ideas about its utility!

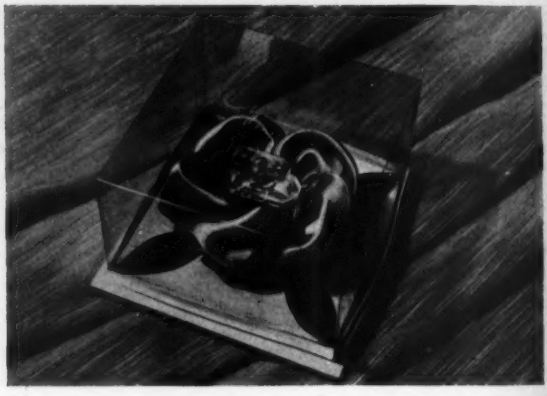
Capsule Trays

Certain medicaments, especially those capsules which tend to stick together when made of gelatine or other low-melting-point material, are by no means easy to pack. When export business to the tropics is considered the problem is apt to become nightmarish. Colt's Patent Fire Arms Manufacturing Co. has sent me some examples of small trays moulded from an amino-resin moulding powder, which are used in the United States for packing vitamin capsules. The trays, which are produced in pastel and gay colours, not only dress the package, but have proved more economical and more sanitary than the combination of paper, tinfoil and other materials used heretofore. The trays are used, of course, in connection with a paper or metal box.



As Through a Glass Lightly

This form of transparent container is not exactly a very new idea basically, although it is the first time I have seen scent bottles so treated. Also the contents, nestling in a satin rose, are probably more beautiful than the box itself, but the whole is so very attractive that I cannot help including it on this page of ideas. Cyclax, of London, call it "Stars in the Heaven"—a name worthy of its contents. The transparent sheet employed is "Cellophane."



"In the Trail of Plastics"

ON March 31 last Mr. H. V. Potter read a paper under the above title before the Society of Chemical Industry in Liverpool.

In his opening remarks he briefly outlined the history of plastics and commented upon the fact that research often produced the most valuable results unintentionally, the discovery of celluloid by Parkes being an example of this. He described the development of casein and the phenol resinoids, and it was pointed out that before the war the most important uses for phenol were for the dye, pharmaceutical and propellant industries, and ample supplies were then available from natural sources. In 1937, for the first time, the demand for phenol exceeded the natural supply and a synthetic plant was established which produced 1,500 tons, the quantity available from natural sources being 4,000 tons. The plastics industry alone absorbed 6,000 tons in that year and phenol had, as a consequence, to be imported. Increased production of phenolic resinoids in this country caused still further demands to be made for phenol, with the result that prices fluctuated to an alarming extent. The position was stabilized by the increased output of the synthetic plant and the increased supplies of phenol available to-day could be attributed to the four following reasons:—

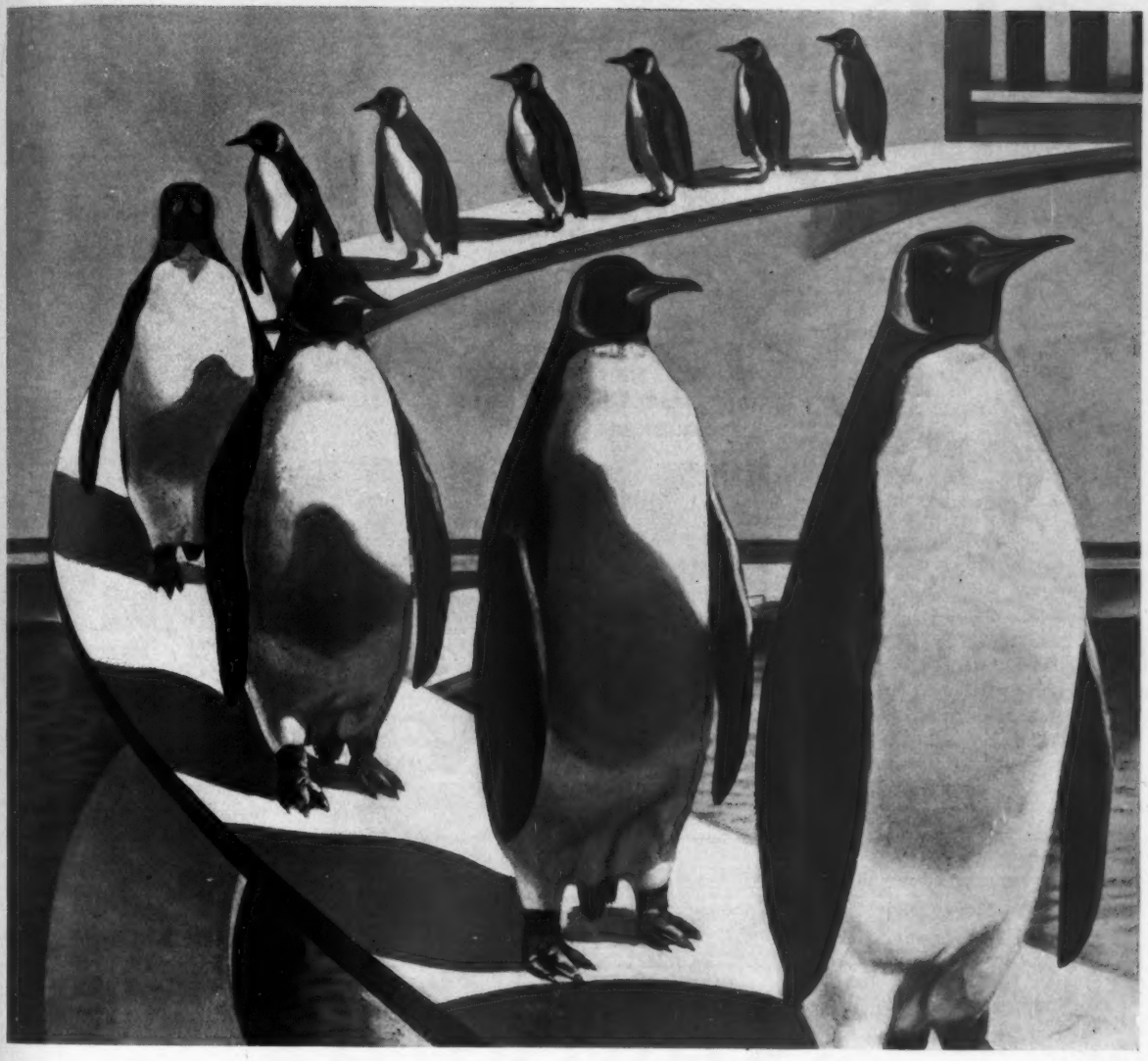
(1) Increase in coke ovens.
(2) Increase in synthetic plant.
(3) New sources from hydrogenation of coal.
(4) Better extraction from waste liquid.

The difficulty of producing water white sheet material from phenolic resinoids led to the development of urea plastics in 1924 and, later, vinyl, styrol and acrylic resins.

The conversion of sawdust into wood flour, it was stated, provided an example of the manner in which the resinoid plastics had beneficially affected other industries. Sawdust was formerly burnt in steam-raising plant while to-day between 7,000 and 10,000 tons annually were ground, sifted and refined for use as a filler in the production of mouldings.

Plastics had undoubtedly assisted in the raising of the standards of ordinary people. With the great possibilities for mass production which their use opens up, an important responsibility was thrown upon the designer for plastics. The readiness with which moulded articles could be produced enabled them to take their place in the poorest homes.

Plastics were making an important contribution to the materials of the aircraft industry. The introduction of special forms of textile material to give increased strength when moulded led to the hollow-moulded airscrew blade. Experiments were being conducted to produce moulded fuselages and wings, and there could be little doubt that these would be manufactured within the near future. These parts would not necessarily be mouldings in the sense in which one usually applied the term, but might be wood impregnated with resinoids. A good deal of work had already been done in the strengthening of wood members with phenolic resinoids and plywood had been greatly improved by use of a phenolic adhesive for the plies. The lecturer mentioned that, as an outcome of joint co-operation between Aero Research, Ltd., and his company, a special plastics material had been developed which had a wood facing and could be glued to other wood members. This material greatly increased the bearing strength of wood in which it was incorporated.



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Clearing Up Misconceptions

A few notes of comfort and of discomfort to those who have little industrial interest in the high-pressure moulding industry

WITHIN the past few months we have received a large number of letters from a class of readers who admit no real knowledge of plastics and yet who seek that knowledge. What is more important is that a large proportion of them are workers, executives, directors and others in industries the demands of which are not satisfied by what the public call the "Bakelite" industry, or, what is a more correct name, the high-pressure moulding powder section of the industry. Such readers belong to the non-mass-production industries and, in a sense, are individualists. That is, they are not of the type who can order, or even wish to make, 5,000 or 10,000 of a particular moulded article. Their especial business either will not stand such an outlay because there is no large market, or they may be fabricators of objects roughly similar, yet which alter slightly in design and detail from one another. And among these are many who cannot consider even casein or cast resins for their work, since they cannot work with rods or plates which must be sliced, trimmed, drilled or turned on lathes and similar tools. In fact, there is a large section of industry who want to employ a clay- or Plasticine-like material which they can shape by hand or by a simple tool in a manner similar to a sculptor, and which, after allowing to stand a day or so, will turn into an "unbreakable," glass-hard material. Their search for this wonderful material has been one long disappointment. Alternatively, they would like a liquid synthetic resin, which, on pouring into a simple or rather easily made mould, will therein harden and again emerge as a transparent or beautifully coloured opaque form, as hard and as strong as Bakelite or Beetle.

We regard such workers of extreme importance to the country, not only because they fill a great want, but also because individualism in industry is as important as mass production. Among such workers, too, are the artists who seek a new medium of expression.

So, if our older readers and those in the plastics industry will permit, we shall address ourselves here to those new readers and clear up a few misconceptions in a simple way.

First, let us admit that the word "plastics," although far from being a misnomer, is not entirely a happy one, if merely because it misleads those whose only conception of plastics is that they resemble putty or sculptors' clay. These two materials are perfect examples of plastics because they can be moulded. But they are not the only really plastic materials, for almost any material, metals included, can be moulded into desired shapes, for we are not limited to temperature and pressure.

For convenience, however, the plastics industry, so called, includes only certain and especial materials, all of them organic materials, as they are called chemically. Thus, to keep the plastics industry within bounds, we exclude clay and stone, concrete, wood and metal and certain other constructional materials. The materials listed under plastics possess characteristics often very similar, especially physically, to one another, and, almost invariably, are products of chemical research. Most of them, but not all, are synthetic.

Perhaps it will be as well to describe, broadly, what materials are, and are not, available to the "individual" worker.

Thermo-setting Powders

(a) Phenol-formaldehyde Moulding Powder.—Known in the trade under the trade marks of Bakelite, Mouldrite, Elo, etc. The powder is a mixture of, roughly, 50 per cent. pure synthetic resin and 50 per cent. wood flour or other filler. Can only be used in high-pressure and high-temperature presses. Under heat and pressure the powder becomes momentarily plastic. After this short period it is cured and issues from the mould completely hardened. Moreover, once it is hardened it cannot be again rendered plastic. And although it can be sawn and drilled, it cannot be carved or readily shaped by hand tools. Readers of the type to whom these notes are addressed complain that they cannot get samples of moulding powder for experiment. Here we are on the side of the manufacturers. It is merely a waste of time sending a sample to workers who will never be able to use it. It is the raw material for mass-producing factories fitted with heavy-duty mass-production machines only.

(b) Urea-formaldehyde Powder.—Known in the moulding trade under the trade names of Beetle, Scarab, Mouldrite U.F., etc. The finished moulded articles are so beautifully coloured that the "individual" worker, or artist, is bitterly disappointed that he cannot

work in them. But as it is a high-pressure, high-temperature moulding powder, employable only in heavy-duty presses, the remarks we have made with regard to phenol-formaldehyde moulding powder apply here in every way. It cannot be used except for mass-production jobs.

(c) Cast Phenol-formaldehyde Resins.—Here we have a material which the "individual" worker can handle if he takes the trouble of understanding the material. Resin suitable for casting is, of course, a liquid and is the pure resin. That is to say, it is similar to the pure resin used under (a), but is not mixed with filler and is in a liquid condition, which, after heating, will solidify to a transparent form; it will be coloured, if colours are previously mixed with it. Until now, however, the liquid resin has rarely been issued to the outside trade or to outside workers, because it is not simply a matter of pouring into a mould and allowing to stand. It has been cast into moulds by the manufacturers of the resin and sold as solid blocks, rods, etc., which the worker himself can manipulate, although this manipulation is limited because of the hardness of the material to polishing, drilling, sawing and general lathe-tool work. Thus, a long tube can be cut into short lengths for table napkins, letters can be cut from flat sheets, a long rod of square cross-section can be cut into dice, and so on.

So far so good. But there is every reason now that the use of this will be spread wider for individualism, since the liquid is now available to the manipulator himself. Messrs. F. A. Hughes and Co., Ltd., have just placed the liquid resin on the market for general use, so that the worker can make his own mould to his own design and cast his own work as he pleases.

But the casting is not a simple matter of pouring in the liquid. As with most chemical materials, there is a special technique. For example, the initial moulding is followed by a stoving under carefully controlled conditions for some 30 hrs. to 150 hrs. at a temperature of 85 degrees C., so that all bubbles are removed, and this is followed by a second stoving at 100 degrees C. for 4 hrs. to 10 hrs. This may prove a disappointment to some who work, say, in plaster, but it must be remembered that these materials are not as simple as plaster or clay. The results, however, will repay patience and are obviously worth while, since the solid forms previously bought by the worker have been a great success commercially.

At this point it is as well to mention yet another new product just issued by the same company, F. A. Hughes and Co., Ltd. It is, in a sense, the answer to the "individual" worker's prayer. It is a phenol-formaldehyde powder which he can use. Although it is probably also suitable for heavy-duty press work, its action has been slowed down, so that it can be softened by slight warming and, in this condition, can be moulded by hand into shape and ornamented and designed by simple tools. It will also remain soft for a considerable period, so that, in a sense, it can be worked like clay. In order to harden it off, it is stoved at a suitable temperature. It is probable, however, that it is limited to certain colours only, so that the beautiful results obtained normally with moulded goods cannot be expected. It should find a great outlet, however, for model-making, where colours are not essential. Colour can, of course, be applied on top. This material is the subject of a recent patent application.

Before we leave the thermo-setting range it will be as well to mention laminated material. This is made by curing sheets of paper, or fabric, which have been dipped in synthetic resin. The result is a very strong sheet of varying thickness to, say, $\frac{1}{8}$ in. normally, which can be obtained in varying colours or bearing designs on the top surface. Since it can be sheared and cut by dies into flat shapes, it proves an admirable material for lamp shades, building up toys or models of various types. Its normal use is for veneering doors and wall surfaces and, of course, electrical work.

Thermo-plastic Materials

Here the individualist will find something more amenable to his hand than the thermo-setting type. This type is plastic under heat and does not "cure." That is to say, on cooling they become hard once again, but can be re-softened indefinitely.

They may be divided into the following types:—

1. Casein.—Made from the casein obtained from milk. After forming into sheets by pressure or into rods by extrusion, it is hardened in a bath of formaldehyde. The sheets and rods thus obtained are extremely strong and tough, and can be drilled and cut into a variety of shapes. The beauty of colouring of this plastic has always made it popular for buttons, handles, dress ornaments, etc.

2. Celluloid.—This is too well known to describe in detail. Sold only in sheet, tube or similar forms for cutting or moulding in simple moulds, after softening in hot water or other means.

3. Cellulose Acetate.—This material has been introduced in recent years to replace celluloid where fire risks are present. As it is non-inflammable its possible range of uses is wider than those of celluloid, which it very closely resembles. Sold in powder or, rather, granule, form for moulding in high-pressure machines or in sheet, tube and thread form, which may be transparent or opaque, and coloured.

The sheet form is very amenable to treatment by the "individual" worker, for on heating to slightly above the temperature of boiling water it becomes very pliable. It can then be cut very easily with shears and can be moulded in a hand press or shaped into curved forms on wooden or metal formers. In general, simple shapes only are possible and the results obtained in light hand presses are not as sharply defined as those obtained in high-pressure machines. Note that neither acetate nor celluloid thermo-plastic can be melted and cast.

Here, again, the powder is not generally available in small quantities. The sheet is readily available.

4. Acrylic-acid Resin Type.—This is sold in moulding powder, block and sheet form under the trade names of Diakon and Perspex. The notes given under cellulose acetate apply similarly to these. Perspex sheet, however, is more transparent and glasslike than acetate sheet and, moreover, is admirably suited for artistic manipulation with carving and turning tools. In our September, 1937, issue we reproduced some of the fine work done by the late Lady Crawford in Perspex. Perspex can also be cast from the liquid resin, but here again special knowledge is required.

5. Styrene Resins.—A transparent plastic sold in powder form for moulding and widely used in the electrical industry. Of little interest to the individual worker.

6. Vinyl-chloride Resins.—Generally rubber-like in texture, and in many respects similar to synthetic rubbers. It is, therefore, improbable that these are of interest unless it is desired to incorporate an oil-resisting unit in some mechanism or toy.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

Pupil-apprenticeship in the Plastics Industry

THE plastics industry up to now has to a very large extent been built up on the accumulated experience of persons who were connected with it in the early days and who have been able to pass on their knowledge gradually to others. The rapidity of the progress of this industry, however, has been so great that an intolerable strain has been placed on the shoulders of the pioneers in the industry to train adequate staff to meet the growing demands.

That such a position should arise is proof that the plastics industry is or will become a major industry in the life of the community, and it is to prevent any possible retrogradation in the growth of the industry that the Council of the Institute of the Plastics Industry has, with the blessing of the British Plastics Federation, the trade organization of the industry, thought that the time is opportune to promote a scheme of pupil-apprenticeship, so that there will be in the future adequately trained and knowledgeable persons available to fill executive positions as and when they are required.

The industry as it presents itself to-day is young, although many parts have been in existence for a considerable period, and there is a danger that within a decade or so there will be a shortage of trained young men to take on the administration of a business that is growing so fast that no one can foresee its future in anything like definite limits.

The Object of Pupil-apprenticeship

The object of the pupil-apprentice is to obtain a systematic training, which will ensure him employment as a trained man in a progressive industry at a remuneration above that of an unskilled or semi-skilled worker. He also has the right to expect that his training, combined with his personal qualities and industry, will enable him to reach the higher positions available.

The object of the employer is to ensure a sufficient supply of properly trained men for designing and making his products and controlling the operations of the various departments.

The aim of the Institute is to assist in the provision of facilities for the systematic training and education of the young people entering the industry and to certify their standard of competence.

Types of Apprenticeship

A youth may be apprenticed with the object of learning the technique of the plastics industry in order that, after his training, he may continue in similar manufacturing employment. Alternatively, this apprenticeship may be a training preliminary to employment in estimating, costing, drawing office or similar technical departments or in the selling or commercial branches of the industry. It may also be arranged that the apprenticeship consists of a period of training in the works, followed by training in one or more of these other departments.

The Institute does not prescribe any definite routine of training, as this is a matter of arrangement between the employer, the apprentice and his parent or guardian. The Institute will not register an indenture of apprenticeship, however, unless it is satisfied that adequate training is to be provided and that the apprentice undertakes to attend suitable educational courses.

As the manufacture of moulds and tools is an important section of the industry, the Institute will also register the indentures of apprentices to engineering firms who are allied to the industry by the manufacture of such moulding tools, as well as those of the engineer tool-maker apprentices within the industry.

In this present scheme for pupil-apprentices the Institute does not provide certificates for those who merely learn the manual operations of manufacturing. It does certify a works training, experience and education which will, in the end, enable the apprentice to correct the faults in all ordinary moulding or manufacturing operations in his branch of the industry, and to direct any alterations necessary in design, tools, material or moulding cycle.

This pupil-apprenticeship to the plastics industry is generally applicable to boys having a secondary school education, who obtain at least three years' practical training spread over several departments of a works. Facilities are also provided for younger boys with elementary school education taking a longer apprenticeship and obtaining the necessary standard of education by attendance at evening classes.

Granting of Certificates

On the completion of his indenture, which has been previously registered, the apprentice shall make application for a certificate on a form which will be supplied and pay the necessary fee.

The application for a certificate may be made at any time

following the completion of the indenture, if the necessary standard of education has not been reached at that date.

The certificate of the Institute will be granted at the discretion of the Council of the Institute and after any further inquiry or confirmation it may think necessary.

A committee has been formed which will advise the Council on all applications for certificates and will also advise employers and apprentices on any matters connected with the scheme. During the early years of working, it will, of necessity, take into account the lack of suitable educational facilities in some districts and the circumstances surrounding special cases, and will advise accordingly.

Class of Apprenticeship

The general requirements for pupil-apprentices in the various classes covered by the present scheme are as follow:—

General Plastics

Not less than three years' approved practical training together with the Institute's second year certificate in Technology of Plastics and Mould Design.

Mould Makers

Five years' approved practical engineering and mould making apprenticeship together with the three year (ordinary) National Engineering Certificate. Mould makers are advised to follow with a certificate in Technology of Plastics and Mould Design which will then be endorsed on their certificates as an extra qualification.

Mould Designers

Not less than five years' approved experience in practical mould making and drawing office work which shall include not less than two years' mould-making experience, not less than two years in a drawing office designing moulds and not less than three months' actual plastic moulding experience. In addition, the second year's certificate in Technology of Plastics and Mould Design will be required.

Art Designers

Candidates for apprenticeship in this class must have attended a school of art or a secondary school providing special tuition in basic art and design.

The apprenticeship should cover a period of not less than three years and include actual moulding shop practice and tool drawing and design. An evening or part time day course at an approved art school should include the principles of industrial art and design, illustration in line, colour and model and run concurrently with apprenticeship.

Further information and advice can be obtained from the Apprenticeship Committee of the Institute on application to the Hon. Secretary (Apprenticeship), The Institute of the Plastics Industry, Windsor House, Victoria Street, London.

"Shelf Appeal's" Awards for British Packaging, 1939

The preliminary details of *Shelf Appeal's* National Packaging Competition are now available. It is with considerable pleasure that we announce that this Journal is co-operating in the award for plastic containers.

The seven judges for 1939 are: (1) A. E. Blake, Editor of *The Manufacturing Perfumer and The Manufacturing Chemist*, (2) A. F. Cowan, The Metal Box Co., Ltd., (3) J. R. Gales, Home Trade Manager, Huntley and Palmer, Ltd., (4) Willis Cooper, Sales Manager, Gillette Industries, Ltd., (5) John Gloag, Director, Pritchard Wood and Partners, Ltd., (6) Miss Leila Solomons, and (7) the Editor of *Shelf Appeal*.

This is the first occasion on which a woman has been included as a judge. It was felt last year that as so many of the products entered in the competition were purchased by women, the opinion of one experienced in retail procedure would be valuable to the committee. Closing date for entries will be June 24.

New Method of Classification

Last year judges, readers and entrants recommended a change in the method of classification so as to avoid confusion in having one pack entered in several sections. The new method, it is believed, will be fairer. Classifications will be as follow:—

1. Floor displays and selling units.
2. Counter displays and selling units
   - (a) cardboard.
   - (b) wood, metal, plastic or glass.
3. Window displays and showcards.
4. Folding boxes.
5. Rigid boxes.
6. Metal containers
   - (a) food.
   - (b) general.
7. Composite containers.
8. Collapsible tubes.
9. Glass containers
   - (a) cosmetic and toilet.
   - (b) general.
10. Wrappers, bags and envelopes
    - (a) opaque.
    - (b) transparent.
11. Rigid transparent containers.
12. Plastic containers.
13. Closures.
14. Labels and Seals.
15. Family range.
16. Shipping containers.
17. Miscellaneous.

Special Awards

(a) Gold Award for the outstanding merchandising achievement of the year.

(b) Award for the best cosmetic pack, or family of packs, awarded in conjunction with *Manufacturing Perfumer*.

(c) Awarded for plastic containers in conjunction with *Plastics*.

Award-winning packs will be placed on exhibition after the contest, and a set of winning packs will also be sent to the U.S.A. and Australia.

Industrial Design

Reimann School,
4-10, Regency Street,
The Editor, *Plastics*. London, S.W.1.

Dear Sir,—In connection with our Department of Interior Design under Duncan Miller, we are instituting a series of lectures by a panel of "visitors," including such well-known people as Serge Chermayeff, Wells Coates, Howard Robertson and Gordon Russell.

These lectures are, of course, for the students of our Interior Design Department, but we are trying the experiment of making the first a public discussion meeting to enable Duncan Miller and his staff to hear the views of people having an interest in the subject, particularly students not necessarily of our own school.

We should also like to have with us people of professional standing and experience, such as yourself, and we very much hope that you will be interested and will be able to come.

In view of the recent changes in the whole approach to technical education, you will appreciate that the occasion offers an opportunity for students of all types to have a voice in shaping an educational policy at an early stage of its formulation, and should therefore produce interesting results.

The meeting will be held here at 8 p.m. on Wednesday, April 19, and I should be very grateful if you would be good enough to let me know whether we may expect you.

BASIL MARRIOTT,
Organizing Secretary.

Inquiries and Answers

Luminous Paints

Ormskirk.

The Editor, *Plastics*.

Dear Sir,—Being an interested reader of your magazine, *Plastics*, I wonder if you could oblige me with one or two addresses of manufacturers of luminous paints. Phosphorus and barium sulphide types for preference.

I am very interested in this subject and would be very grateful if you could grant my request. E. CASS.

[EDITOR'S NOTE.—The following four firms are manufacturers of luminous paints, using barium sulphide as a base:—Griffiths Bros. and Co. (London), Ltd., 29, Macks Road, London, S.E.16; Walpamur Co., Ltd., Darwen, Lancs; Walter Carson and Sons, Ltd., Grove Works, Lombard Road, London, S.W.11; Nobles and Hoare, Ltd., Cornwall Road, London, S.E.1. As for phosphorus paints, we are afraid we do not know the names of any manufacturers, although we presume there must be some. If you wish for these, your best course would be to write to Messrs. Albright Wilson and Co., Ltd., of Oldbury, near Birmingham, who supply the phosphorus for making such paints. They would be sure to know the makers. We remember that a Balmain's luminous paint is manufactured somewhere in Kent.]

Hydrogen and Helium

Newtown Butler.

The Editor, *Plastics*.

Dear Sir,—Could you inform me where hydrogen and helium gases, for use in balloons, may be obtained? Also, is Neoprene sold in this country? "CAM."

[EDITOR'S NOTE.—The first is, indeed, a strange request for this journal. However, so far as we know, the only company producing hydrogen and helium as industrial gases for sale would be the British Oxygen Co. The latter gas is used in the "neon" system of lighting for giving special effects. As the reader probably knows, helium is obtained in reasonably large quantities only in the United States from natural petroleum gases. In this country very small quantities are obtained from the air by low-temperature fractionation. Neoprene is sold by Imperial Chemical Industries, Ltd., Millbank, London, S.W.1.]

Sales Representation

Toronto.

The Editor, *Plastics*.

Dear Sir,—We are always pleased to receive our monthly copy of your extremely interesting and valuable trades publication *Plastics*, although we are not engaged in the plastic industry.

Our work is entirely within the field of stainless steel and solid aluminium. We manufacture and process a varied line of mouldings and structural units for the building industry. Our outlets are the established lumber and building supplies dealers of the Dominion, and we have a territorial coverage from Atlantic to Pacific.

Our confidence in the future of the plastics industry, particularly for British manufacturers, warrants our approaching you at this time. We are extremely desirous of being put in contact with British firms of moulded products, especially those whose lines are sold through builders, contractors, lumber or timber yards, or building supplies houses.

We would also appreciate your directing our inquiry to plastic manufacturers in general who are anxious to extend their sales representation in Canada, and you can assure any interested party that we will deal on a strictly merchantable basis and furnish trade and financial reference of the highest calibre.

MODERN MOULDING SUPPLY CO.

[EDITOR'S NOTE.—Will manufacturers interested in the above please write to this office or direct to the above concern?]

Preservation of Flowers

Sydney, N.S.W.

The Editor, *Plastics*.

Dear Sir,—In your January issue of *Plastics*, page 8, you feature an article describing an embedding medium for the preservation of flowers, etc., and at the end of the article give the name of J. M. Steel and Co., Ltd., but no address.

While we realize that this material may still be in the experimental stages, would it be possible to obtain further details and possibly small supplies of this material?

We fully realize that this may not be possible, but if you could forward us the correct address or contact the correct people for us we would be obliged.

In closing, we would like to mention that we have been subscribers to *Plastics* since it first appeared in Australia, and look forward to its arrival every month.

W.J. MANUFACTURING CO. PTY., LTD.

[EDITOR'S NOTE.—We have asked Messrs. J. M. Steel and Co., Ltd., of "Kern House," 36-38, Kingsway, London, W.C.2, to get into touch with the inquirer.]

Plastics and the Theatre

42-43, St. Paul's Churchyard, London, E.C.4.

The Editor, *Plastics*.

Dear Sir,—We have read with great interest Mr. C. B. Cochran's letter published in the March issue of *Plastics*, and we must thank you for your note correcting this gentleman's impression that Rhodoid can only be bent one way.

While, however, you have made it clear that when hot Rhodoid can be bent with two or more sharp angles, we should like also to emphasize that by hot embossing multi curvature three dimensional forms are readily obtainable.

As readers will probably realize, it is the very fact that Rhodoid can be easily moulded and fashioned to almost any shape that is largely responsible for its great popularity among theatrical designers and others connected with the profession.

An additional and equally important fact is that new qualities and types of Rhodoid are continually being introduced, and this has done much to preserve the novelty value of Rhodoid since long before Mr. Cochran's production "Streamline," and right up to the present moment when it may be seen in Mr. George

Black's new show "Black and Blue." We understand that Rhodoid will also be used for a number of purposes at the reopening of the London Casino.

With regard to the price of 2s. 6d. per foot quoted in Mr. Cochran's letter, we would point out that as so many types of Rhodoid are available, all of which are sold by weight, and as many different thicknesses are used, this figure may frequently be lower.

MAY AND BAKER, LTD.

Moulding from Etched Blocks

West Croydon.

The Editor, *Plastics*.

Dear Sir.—We have seen in your publication book-covers and similar mouldings apparently made from half-tone blocks, and we should be obliged if you would let us know whether there is any patent covering this type of moulding. We mean to mould from half-tone blocks and fill the mould with colouring matter.

E. W. PUCKERT, LTD.

[EDITOR'S NOTE.—We presume the reader refers to the notes we published on the work of British Artid Plastics, Ltd. We believe this process is being worked under patents and application for further information should be made to the company at the Slough Trading Estate. We do not know that the ordinary etched block is used.]

Collapsible Tubes

Buenos Aires.

The Editor, *Plastics*.

Dear Sir,—We note with interest the announcement, on page 66 in the February, 1939, *Plastics* journal, on collapsible paste tubes.

For some time we have been considering the same idea for collapsible tubes and would greatly appreciate your co-operation in sending to us the address of the most reliable collapsible plastic-tube manufacturer.

RCA. VICTOR ARGENTINA
(Plastic Division).

[EDITOR'S NOTE.—We do not know of any manufacturers in this country actually producing collapsible tubes made from plastics, but there is no difficulty in producing them. The market has not been attacked yet, for the metal tube has long held it. In Germany, where every attempt is made to avoid using the expensive and imported tin, the problem is relatively simple. We advise writing to Hydro-Plastics, Ltd., Danemere Street, Putney, London, S.W.15, who extrude plastic tubes for other industrial purposes.]

Table Tops

Manchester.

The Editor, *Plastics*.

Dear Sir,—We are interested in a suitable plastic material for table tops, but it must be inexpensive.

We have already approached Messrs. Metropolitan-Vickers, Ltd., and Turner Asbestos Co., of Manchester, but their materials are much too expensive for our requirements.

Could you kindly suggest or put us in touch with any manufacturer of a suitable material for our purpose, which must be in a glazed finish in various shades, but, above all, inexpensive? E.P.

[EDITOR'S NOTE.—We presume the writer refers to laminated sheet for table tops. While we do not concern ourselves, generally, with prices, we must point out that a product that gives such manifest advantages over wood in being permanently polished, unattacked by acids, alkalis and cigarette ends in addition to being highly decorative, does deserve the compliment of a higher price.

However, the writer should approach such firms as Bakelite, Ltd., British Industrial Plastics, Ltd., Warerite, Ltd., for whose addresses see the directory at the beginning of this journal.]

Furniture

Chippenham.

The Editor, *Plastics*.

Dear Sir,—We are building a house and I am interested in the use of plastic materials for the following purposes:—

(1) Fireplace surrounds and hearths.

(2) Cupboard doors and the front of a fitting like a cocktail bar that will have to stand up to possible knocks and kicks from boys' boots.

(3) Bathroom walls.

Will you be good enough to put me in touch with possible suppliers of these demands, as I find our architect lacks enthusiasm for such research and I have no other means of discovering the facts. Fireplaces particularly interest me, and I bought a copy of your paper in the hope that it might help us to get in touch with the manufacturers of what we want.

I shall be most grateful if you can help, as time is short and difficulties apparently impenetrable.

E.H.S.

[EDITOR'S NOTE.—We sympathize enormously with the reader in her difficulties. It seems such a pity that plastic materials are not yet accepted by the average architect or builder, who, in general, is not only unacquainted with what is available in plastics, but does not know where to get the material. The wholesale supplier does not stock the goods as he does porcelain, metal and the older materials.

The only suggestion we can make is to obtain advice from those manufacturing companies who produce the goods and, through them, the names of the distributors.

(1) Fireplace surrounds.—Ashdowns, Ltd., of Eccleston, Lancs, make these in several designs.

(2) Cupboard doors.—Concerns such as Bakelite, Ltd. (40, Grosvenor Place, London, S.W.1), British Industrial Plastics, Ltd. (1, Argyll Street, London, W.1) and Warerite, Ltd. (Watton Road, Ware, Herts), make the sheet in various designs and sell to concerns such as Frederick Sage, Ltd., who build up the furniture.

(3) Bathroom tiles.—Ashdowns, Ltd., and Roanoid, Ltd. (95, Bothwell Street, Glasgow, C.2), make tiles in a variety of colours.]

Models of Human Limbs

Karachi.

The Editor, *Plastics*.

Dear Sir,—We are desirous to know the names and addresses of the manufacturers of plastic models of human limbs showing effects of war gases. We have, therefore, to request you to please let us know who makes the same. THE AERO STORES.

[EDITOR'S NOTE.—We have seen some of these limbs in connection with A.R.P. work, but feel sure they have not been made out of synthetic resins or cellulose acetate. The important wounds and colouring are cut and coloured on plaster. Acetate could be used, of course, as the basic material. I should advise writing to the Home Office Museum, Horseferry Road, London, where several are exposed to view. The Museum is in close touch with manufacturers.]

TRADE AND PERSONAL NOTES

The Department of Scientific and Industrial Research has forwarded us a booklet dealing with the detection of nitrous fumes in industrial processes. This publication, "Methods for the Detection of Toxic Gases in Industry, Leaflet No. 5, Nitrous Fumes," is published by H.M. Stationery Office, 3d. net.

Nitrous fumes, which may be present in dangerous concentrations in celluloid works, dyestuffs works, nitro-cellulose paint factories, etc., are extremely dangerous on account of their insidious character. There may be, and generally are, no immediate effects and, therefore, it is impossible to foretell the serious consequences that may result from the inhalation of these fumes. A workman, unaware that he has inhaled the fumes, continues at work, often remaining well until after he has returned home. Some hours later he becomes restless with a dry cough and shortness of breath. These symptoms increase, accompanied by a frothy sputum tinged with blood. If appropriate treatment is not applied, death follows from œdema (waterlogging) of the lungs.

Concentrations stronger than 1 in 10,000 are frequently fatal if breathed for more than a few minutes. It is, therefore, most important to note that a concentration which is dangerous to inhale for even a short time may be hardly noticeable, because no disagreeable symptoms may be produced. For this reason any atmosphere in which nitrous fumes are noticeable either by smell, irritation, or colour should be regarded as dangerous.

The chemical test described in the leaflet is sufficiently sensitive to be readily capable of detecting a concentration of 1 part in 100,000.

Alfred Herbert, Ltd., Coventry, are to be congratulated on the present number of "Machine Tool Review," which contains many articles of great interest to tool makers and, indeed, engineers in various industries. A full description is given of the Norton Multi-purpose Grinder, which is a new hydraulic universal grinding machine suitable for high precision tool-room work or for a wide variety of production jobs. The same fundamental characteristics of design, which have proved so successful in other Norton products, have been incorporated in the new machine. It is much heavier than previous models of the Multi-purpose Grinder. Ease of adjustment, ease of operation and a rugged construction, ensuring many years of service and accuracy, are outstanding features of the machine.

The British Cellophane, Ltd., have forwarded us the latest issue of their live and bright publication, "20th Century," which, as usual, contains a number of very interesting articles describing new packaging applications for "Cellophane" cellulose film.

The Ideal Home Exhibition, at Earls Court, will be open from April 11 to May 6.

Aerex Fans, a branch of Colliery Engineering, Ltd., 36, Rutland Park, Sheffield, 10, have sent us two publications describing their Aerodynamic screw fans and Aerodynamic screw fan plant for industrial use. The Aerex screw fan is of axial flow design and the blades are in solid metal and profiled to true aerofoil sections giving efficiencies of 85 per cent. to 90 per cent. This results in considerable power saving. Other advantages include non-overloading characteristics, compact layout, vibrationless running, reversibility and simplicity in construction. Pages 2 and 3 of publication No. 405 give the numerous advantages to be derived from the use of these fans. Pages 4 to 7 of publication No. 306 illustrate and describe the manufacture and assembly. Both publications are simply illustrated with arrangements of fans and plants in use. Aerodynamic screw plant is of particular advantage for such applications as drying, fume removal, ventilation and mechanical draught. Aerex Fans will be pleased to send copies of these publications to any of our readers who may be interested.

G. H. Gregory and Co. (Plastics), Ltd., formerly of 23, Winston Road, Stoke Newington, London, N.16, have recently moved to enlarged premises at 79, Lea Bridge Road, London, E.10. Their new telephone number is Leytonstone 1407. It will be remembered that the name of this firm was at one time Messrs. Gregory and Sons, Ltd.

Steele and Cowlishaw inform us that their address is now Cooper Street, Hanley, Stoke-on-Trent, and their telephone number Stoke-on-Trent 2109.

W. Edwards and Co., Allendale Works, Southwell Road, London, S.E.5, have forwarded us a new catalogue which describes the characteristics of the famous Kipp and Zonen galvanometers, which are widely used by research workers in industry. The moving system of the Moll galvanometers consists of a coil stretched between two wires, by which method a perfect stability of the coil is ensured, the more so as the coil is exactly balanced. The Zernike models have very high volt sensitivity as a light coil is used, suspended by a thin quartz fibre. The moving system is perfectly balanced and in this type also the stability is exceptional.

E. K. Cole, Ltd., will be exhibiting at the Manchester Trades Exhibition, April 18-29. Their main display will be concerned with the Thermovent electric convectors, which make possible completely effective thermostat control. The various types shown will include portable floor-standing and inset models in steel and moulded casings. Originally devised for the "Queen Mary" and re-ordered for the "Queen Elizabeth" and the new "Mauretania," Thermovents are suitable either for main or background heating and may also be used in the outlet of plenum, air-conditioning systems.

W. C. Ritchie and Co., 8,855, Baltimore Avenue, Chicago, who are specialists in all forms of packaging, particularly transparent boxes, have forwarded us a most interesting brochure which emphasizes transparent packages. They state that in America, at least, more interest is being shown in the development of the transparent idea in packages than any new development in more than a decade. They believe that the development possibilities are almost unlimited, the only drawback at the present time being that the material in sheet form is still quite expensive, and this, so far, makes it difficult to get a low-priced package. As the use of the material increases in volume, W. C. Ritchie and Co. are of the opinion that the prices of the material will undoubtedly become lower and open up other packaging fields. Incidentally, Ritchie and Co. make use of Vue-Pak, the new transparent wrapping material of Monsanto Chemical Co.

Dr. R. G. Baron and Dr. P. Schidrowitz read a paper entitled "Some Observations on the Use of Synthetic Resins in the Rubber Industry" at a meeting of the London and District Section of the Institution of the Rubber Industry on March 27 .

Saunders Valve Co., Ltd., Wolverhampton, have now opened their £100,000 new factory at Cwmbran, Monmouthshire, which is in an area developed by the Treforest Trading Estate on behalf of the Commissioner for the Special Areas.

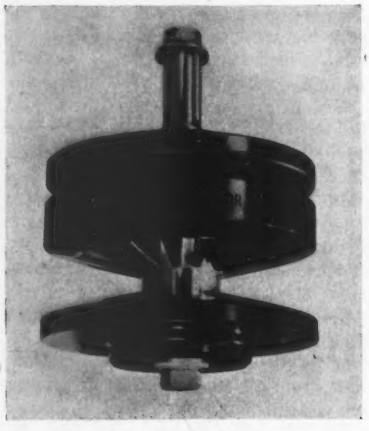
Ceylon has taken to the manufacture of plastics, thereby introducing a new and important industry into the island. Two 80-ton presses have been set up in Colombo for the manufacture of finished goods from synthetic resin. All kinds of articles, from soap dishes to ambitious electrical insulating equipment, are being moulded.

NEW MATERIALS—NEW PLANT—NEW METHODS

New "Speedmaster" Drive

Continental Machine Specialities of Minneapolis announce an improved design and lower price for their Speedmaster Variable Speed Pulleys. These new infinitely variable speed pulleys are moulded of solid high impact strength Bakelite, accurately trued and balanced before final assembly. An improved pressure lubricated bronze sleeve allows the splined centre sheave member to operate freely, regardless of load or speed.

The new construction is available in two sizes, a 3½-in. diameter size for drives up to ½ h.p. capacity and a 6½-in. diameter size for drives up to 3 h.p. capacity. The pulley is very flexible in its adaptability to both "straight line" and "angular" drives. Interposed between motor and driven unit, the position of the pulley can be changed to vary the centre distances of the Speedmaster pulley in



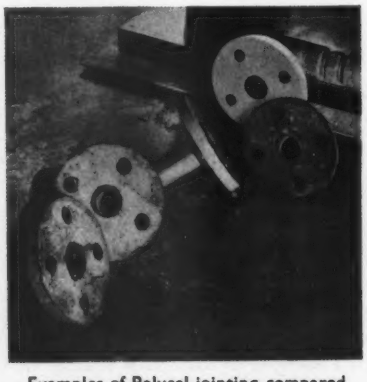
relation to the drive and driven sheaves. The belts thus assume smaller or larger operating pitch diameters through the action of the variable pulley faces. Control of speed is made through a quick action lever, or a handwheel allowing control of speed with 1 r.p.m. The entire unit is free floating, so that belt alignment is accurately maintained at all times.

Advantages claimed by the manufacturer for the improved Speedmaster are: A six-to-one to forty-to-one ratio of infinitely variable speed, the use of standard "V" belts, and long belt and pulley life because of the moulded plastic work faces.

This wide range transmission was originally developed for use in the company's "Doall" Sontour Band Sawing Machine and was later produced as a separate unit.

New Sealing and Jointing Materials.

Wondegrip Products, Ltd., Great West Road, Brentford, Middx., have sent us a catalogue describing in a very comprehensive and attractive manner their range of materials which are suitable for a number of important engineering applications. At the present time they are placing four products on the market. These are three sheet jointings—Aerocel, Polycel and Elaicel, and an insulating board, Kalorcel. The first named is a sheet jointing specially resistant to the action of oil and petrol. It has been designed to withstand the most exacting conditions and has been found to have eight times the life of ordinary jointing and particularly suitable for aero-engine work and for all petrol, water and oil joints where extreme reliability is essential. Polycel is designed as a general-purpose jointing for all normal steam and hydraulic purposes at a temperature up to 150 degrees C. Its compressible properties make it an exceptional sealing medium. For boiling jointings and the like it is unnecessary for the holding-down bolts to be screwed down very tightly, as the sealing action of Polycel increases with rise of temperature. Elaicel is the Wondegrip oil jointing for general industrial use. It is proof against the action of petrol and most diluted acids and is specially recommended for electrical transformers and oil-immersed switchgears. Kalorcel is a heating insulating board of exceptionally low conductivity, specially designed to withstand high pressures and rough usage and to resist the action of moisture. It is, therefore, particularly suitable for the insulation of hydraulic presses where heated platens are employed, or in positions where other materials fail through vibration, shock or pressure.



Examples of Polycel jointing compared with competitive jointing on left after a steam and water test.

Lining Plastic Containers with Silver Plating.

According to *Modern Plastics*, the Metaplast Corporation of America is now offering equipment for sale for providing moulded containers with a non-porous silver-electroplate coating. This, it is reported, eliminates any moisture absorption from the contents which might cause warping, swelling or cracking of the material under certain conditions. The impermeability of the liner insures freshness by guarding the moisture and flavour of the product.

Printing on Plastics.

The Peerless Roll Leaf Co., Inc., 915, New York Avenue, Union City, N.J., U.S.A., are now offering equipment for the rapid printing of plastic surfaces. One single operation of a Peerless stamping press engraves the design or lettering into the surface of the plastic material and transfers the stamping foil at the same time. Designs or lettering engraved by the Peerless Process do not rub off like printing. They usually retain their clean-cut appearance for the lifetime of the product. It is stated that a brass or steel die, a roll of Peerless stamping foil and a Peerless stamping press are all that are required to mark mouldings and all manner of plastic goods.

Wild Barfield Heat Treatment Journal

The March issue of this extremely practical and useful journal contains two outstanding articles. The first deals with "Hardenability" and is an abridged form of a symposium before the American Society of Metals during the National Metal Congress in Detroit in October, 1938. The factors which affect the depth of hardening may be grouped in two classes.

The factors largely inherent in the steel such as austenite composition; austenite grain size; the amount, nature and distribution of insoluble or undissolved particles in the austenite. The above factors are dependent upon the inherent properties in the steel: they determine the critical cooling rate and are fixed by analysis, deoxidation practice, prior structures, quenching temperature, etc.

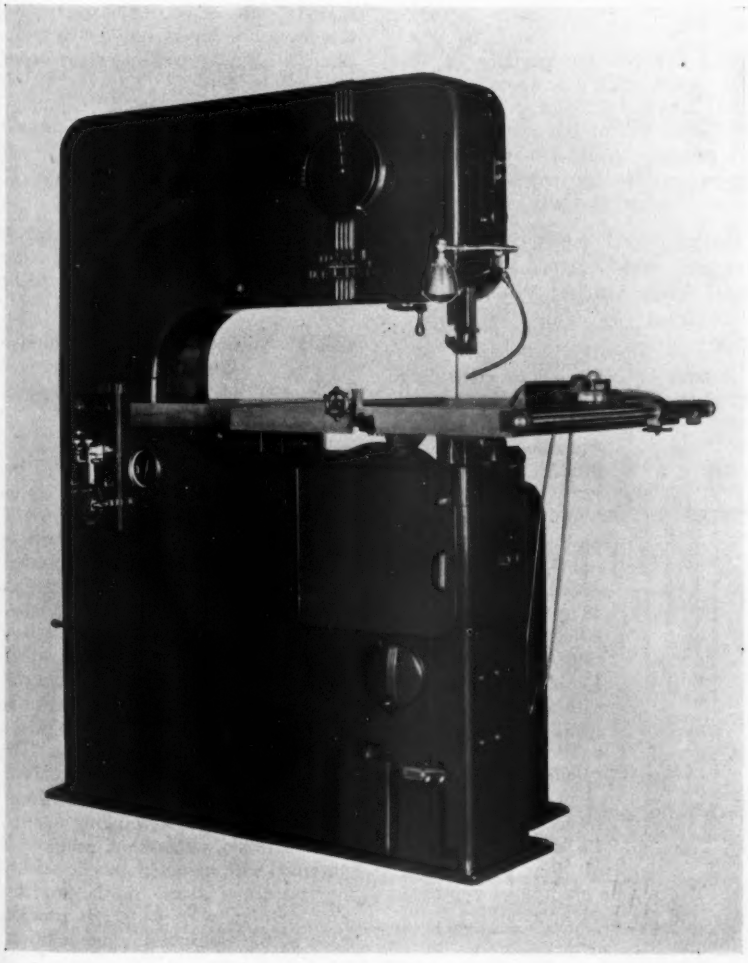
The second group is made up of factors largely external to and independent of the steel, such as size of specimen, condition of the surface and heat abstracting power of the quenching medium. The second and smaller article is really a practical hint for hardening long slender tools.

NEW SHAPE CUTTING PROCESS FOR PLASTICS

IN 1935 Continental Machines, Inc., of Minneapolis, placed the first all-purpose die-cutting band saw on the market. The machine was made possible through the development of very narrow band-saw blades that came out about that time. Since then these narrow saws have been developed to a still higher point of toughness and are made in still narrower widths. As a die-making machine, the company's "Doall" was met with open arms because it eliminated the tedious method of drilling a row of holes to make an inside cut-out.

In pioneering the art of contour sawing a new field has been developed entirely apart from die making. To fill this need the Doall was redesigned to match the precision and ruggedness of the machine tools it was called upon to supplement. The evolution of contour sawing has produced a new kind of machine tool to cut shapes and contours in any metal or material. It cuts at the rate of 1½ ins. per min. in 1-in. thick tool steel. In cast iron it cuts 3½ sq. ins. per min. There is practically no limit to the work-thickness capacity. Tilting the worktable makes it possible to cut angles as well as contours in one operation. It removes a section as a whole piece instead of reducing it to chips, as with shaping or drilling. Thus material is saved. The cut leaves a slit only $\frac{1}{16}$ in. wide. Contour sawing makes a clean, machined finish without distorting the metal or materials in the cut. It saws the toughest stainless and high-carbon steels and it cuts aluminium, brass, plastics and the softer substances. The saws cost about 80 cents per band, and last for over 600 sq. ins. of cutting. Saws are instantly welded into bands with an automatic butt welder in the machine for internal cuts.

The new machine is massive and rugged. It has a 36-in. throat and 10-in. work-height capacity. It is built of arc-welded steel and the housing also serves as the frame of the machine. The worktable tilts in four directions, is 30 ins. square and 2½ ins. thick, box-type construction.



A 1 h.p. motor drives the machine first through the company's "Speedmaster" Bakelite pulleys, which give infinitely variable speed, and then through a silent transmission. The transmission contains eight helical gears, which run in oil. A speed range from zero to 1,500 surface ft. per min. is available in this machine, and a tachometer dial is conveniently located to tell the exact speed. The correct speed to use for contour sawing is shown on another dial mounted on the machine, which is called the "job selector."

A ¼ h.p. motor drives a small grinder wheel, mounted in the panel just under the automatic butt welder, for removing the "flash" of the weld on the saw bands.

An entirely new-type saw guide has been developed for this machine. It holds the back of the saws more securely and closer to the work, both below and above the worktable. These guides are adjustable for wear.

A new piston-type pump is employed for the air jet, which keeps chips from accumulating at the point of work. Ball bearings are used throughout the entire machine at wearing points. Furnished with this new model is the three-power illuminated magnifying glass for close work, 20 saws, two files and three polishing bands. The electric wiring is centred in one built-in junction box and each machine is shipped ready to tap in and run.

In the evolution from a die-making machine the Doall has developed its own personality, distinctly different from the more cumbersome, single-purpose tools. It is more flexible, more sensitive, and operates at higher speed. Its speed and flexibility make it necessary to eliminate bulk weight found in the shaper, milling machine and tool-room lathe. This new tool can dispense with bulk weight because it does not have to peel off material in bulky chips. Instead, the chips it makes are fine particles in a narrow slit. Therefore the Doall is not as cumbersome as these other machine tools and is, in fact, a precision instrument for shape cutting.

Furthermore, this new machine tool operates file bands and polishing bands for jobs that require high "finish" after the sawing operation. Shopmen have learned that, generally, the single-purpose machine tool works out best. Like the "one-man band," you do not get harmony in mongrel machines that combine unrelated duties. But some functions do go together in one tool and belong together. Drilling and reaming, for example. Planing and shaping both belong to the shaper. Likewise, in the Doall there is a natural sequence of operations. Filing generally follows sawing in making accurate shapes and economic production is fully assured.

PATENTS RELATING TO PLASTICS

These abridgments of recently published specifications are specially compiled for this journal by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet, as issued, on payment of 5s. per group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each.

496,574. Polyvinyl Compositions

I. G. FARBENINDUSTRIE AKT.-GES. June 1, 1937.

In the manufacture of artificial materials from polyvinyl or polyacrylic compounds there is incorporated with the polymeric body a di-ester of an unsubstituted aromatic or cyclo-aliphatic acid and di, tri, tetra, or penta-ethylene glycol. In examples, sheets are prepared from (1) polyvinyl chloride and diethylene glycol benzoate, (2) a mixed polymerizate of vinyl chloride and acrylic acid ester and triethylene glycol dibenzoate, (3) polyvinyl chloride and triethylene glycol dinaphthenate and (4) polyvinyl chloride or a mixed polymerizate of polyvinyl chloride and acrylic acid ester.

496,430. Shaped Resinous Condensates Products.

LIEBETRUTH, F. W. December 1, 1937.

Shaped bodies are prepared by cold rolling a filler with an aqueous solution of a resinous condensation product, stamping the shaped body out of the sheet and hardening by allowing the body to stand or by baking it. Suitable fillers include light spar, wood meal, kieselguhr, lithopone, lenzine, titanium dioxide, or silicate mixtures with admixture of dextrine, and suitable resinous condensation products include kaurite (urea-formaldehyde condensate) or resinite (phenol-formaldehyde condensate). The material obtained may be coloured or impregnated.

496,438. Synthetic Resin Compositions

LORENZ AKT.-GES., C. February 8, 1939.

Electric insulating material comprises 32 per cent. of a phenol-formaldehyde condensation product, 65 per cent. of quartz and 3 per cent. olein.

496,660. Synthetic Resin and Cellulose Derivative Lacquers

I. G. FARBENINDUSTRIE AKT.-GES. June 3, 1937.

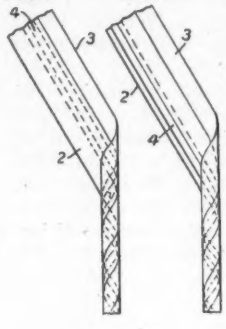
Pastes of a high pigment content suitable for incorporation in lacquers containing cellulose derivatives or artificial resins are obtained by grinding the pigments with esters of dibasic acids with alcohols of high boiling point, e.g., 140 degrees C.

495,199. Cellulose Tubes; Drinking-straws

DIEFFENBACH, O. W. May 11, 1937.

A drinking tube or straw of the kind described in Specification 468,979, and comprising two helically wound offset strips 2, 3 of flexible transparent cellulose derivative, is reinforced by a relatively narrow strip or strips 4 of plain or coloured cellulose or other suitable flexible material helically associated therewith. The reinforcing strip or strips may be positioned between the portions of the main strips which overlap on the same turn of the helix, Fig. 1, or else associated with one of the main strips in superimposed relation and thus positioned between the overlapping portions of adjacent turns of the helix, Fig. 3.

FIG. 1. FIG. 3.

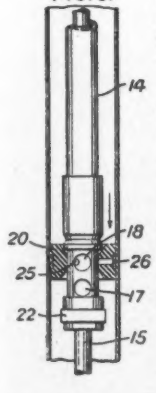


494,397. Fire-extinguishers; Synthetic Resin Articles; Piston-packing

PYRENE CO., LTD. March 21, 1938.

Relates to a method of expanding the piston packing-ring by liquid pressure, in a fire extinguisher of the type described in Specification 257,805 [*Class* 102 (i)], in which the piston 20 is movable on the tubular piston-rod 14, and controls discharge ports 17, 18 in the rod 14. The latter slides on the central discharge tube 15 and is provided with a stuffing-box 22. According to the invention, the piston is provided with passages 25, which admit liquid from the port 17 or 18 to the back of the packing-ring 26. The piston may be of synthetic resin and the packing-ring may be of celluloid.

FIG. 5.



495,659. Articles Made of Cellulose Esters or Ethers

DE LA RUE AND CO., LTD., T., and KNIGHT, E. G. July 8, 1937.

Fountain-pen barrels are formed partly of transparent nitrocellulose or other ester or ether of cellulose and partly of similar but relatively opaque material arranged to form a mesh pattern, the barrel in normal aspect appearing opaque but when held up to the light being sufficiently transparent to enable the level of ink to be seen. The mesh pattern is repeated about 8—16 times to the inch, and the transparent portions are approximately one-and-a-half to twice the width of the relatively opaque portions. The barrel is preferably formed by compressing into a block layers of transparent and opaque material, slicing the block across the laminations, compressing the sliced layers with interposed layers of opaque material into a further block, slicing this block into layers, and finally wrapping on helically winding these layers into tubular form.

495,738 Synthetic Resin Window-regulator Mountings

AUTO UNION AKT.-GES. November 20, 1937.

A facia board on which are provided bearings for vehicle window-regulator mechanism is moulded from synthetic resin.

496,354. Cellulose Ether Adhesive Compositions

SICHEL AKT.-GES., F. February 22, 1938.

In the production of sizes the reaction products obtained by the action of monohalogen fatty acids on alkali cellulose is treated with an aluminium compound, such as alum or aluminium acetate, and the precipitate formed is washed with water to free it from soluble salts and then treated with alkali. The resulting product consists essentially of an alkali salt of a cellulose ether carboxylic acid, and can be diluted with water to give a size solution, or dried to give a size composition in powder form. The size solutions are suitable as adhesives, book-binding sizes, finishing and dressing agents and colour binding agents. In an example, unbleached cellulose is etherified with monochloracetic acid in the presence of alkali, and the product, after dilution with water, is precipitated by the addition of alum solution.

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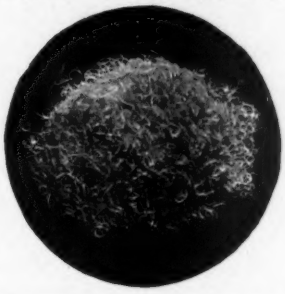

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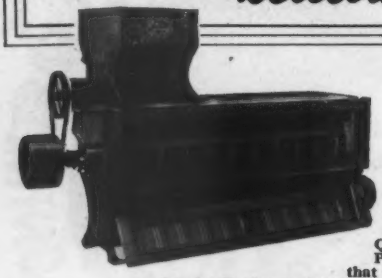

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